SERVICE MANUAL

FISHER

AD-M700

Digital Compact Disc Player

(EUROPE)

POWER
COMPACT disc DIGITAL AUDIO
OPEN/CLOSE
Studio-Standard BY FISHER
DISPLAY
TRACK NO.
REPEAT
PROGRAM MEMORY
DIGITAL
COMPACT DISC PLAYER AD-M700

CONTENTS

Important Notes 3
Specifications 3
Safety Certification 4
Functional Check 5,6
P.C.Board Location 7
Functional Block Diagram 8
Safety Interlock 9
Laser Beam Signal Flow Within Optical Pickup 10
Use Extreme Caution When Handling Pickup 11,12
Preparation Before Operation 13
Connecting the Digital Compact Disc Player 13,14
Control and Operation .... 14 – 18
Automatic Function System and Synchro Recording 18
Disassembly Sequence 19,20
Disassembly of Each Part .... 21 – 32
Adjustment Procedures 33
Test Equipment Required 34
Compact Disc Player Adjustment .... 35 – 48
  Laser Power Adjustment 35,36
  Disc Loading Mechanism Adjustment 36,37
  Disc Loading Adjustment 37
  PLL Clock Adjustment 38
  Focus DC Offset Adjustment 38
  Tracking DC Offset Adjustment 39
  HF Level Adjustment 39,40
  Pickup Posture Adjustment 40,41,42
  Tracking Error Symmetry Adjustment 43
  Focus DC Balance Adjustment 43,44
  Pickup Starting Position Adjustment 45
  Lens Shift Range Adjustment 45,46
  Pickup Motor Shifting Speed Adjustment 46,47
  Focus and Tracking Servo Gain Adjustment 48
  Right and Left Channel Balance Adjustment 48
Function of Compact Disc Player .... 49 – 66
  Focusing Servo System .... 49 – 52
  Tracking Servo System .... 52 – 56
  Laser Radiation Circuit 57
  Lens Shift Circuit 58,59
  Brake Circuit 60,61,62
  Configuration of Micom .... 62 – 66
IC's in Decoder and Waveform & Function .... 67 – 76
  Demodulater (SAA7011) 67,68,69
  Error Corrector (SAA7020) 70,71
  Concealment of Errors by Interpolation and Muting (SAA7000) 71,72
  Filter (SAA7030) 73
  D/A Converter (TDA1540) 74
  IC111, 112, 113 75
  IC110 (TC40H000D) 76
Cabinet & Chassis Exploded View 77,78,79
Cabinet & Chassis Parts List 80,81
Mechanism Exploded View 82,83
Mechanism Parts List 84,85
Printed Circuit Board (Bottom View) .... 86 – 101
Parts List .... 102 – 110
Semiconductor Lead Identification 111,112,113
IC Pin Allocation 114,115

IMPORTANT NOTES

This unit reads digital audio signals with a track width of 0.5 µm and a track pitch of 1.6 µm at a constant linear velocity of approximately 1.3 m per second.

Micrometer accuracy and tolerances are required at the factory for assembly, adjustment and test procedures. Before attempting to service this unit, we recommend a careful reading of this manual.

PROTECTION AGAINST EXPOSURE TO LASER WHILE SERVICING

As a laser is used in this unit to read the audio signals, use extreme care while servicing, being sure to observe the following items.

NOTE: When servicing is performed while the laser beam is emitted, avoid eye or skin exposure to either direct or scattered radiation. Be sure NOT to look into the pickup lens while servicing.

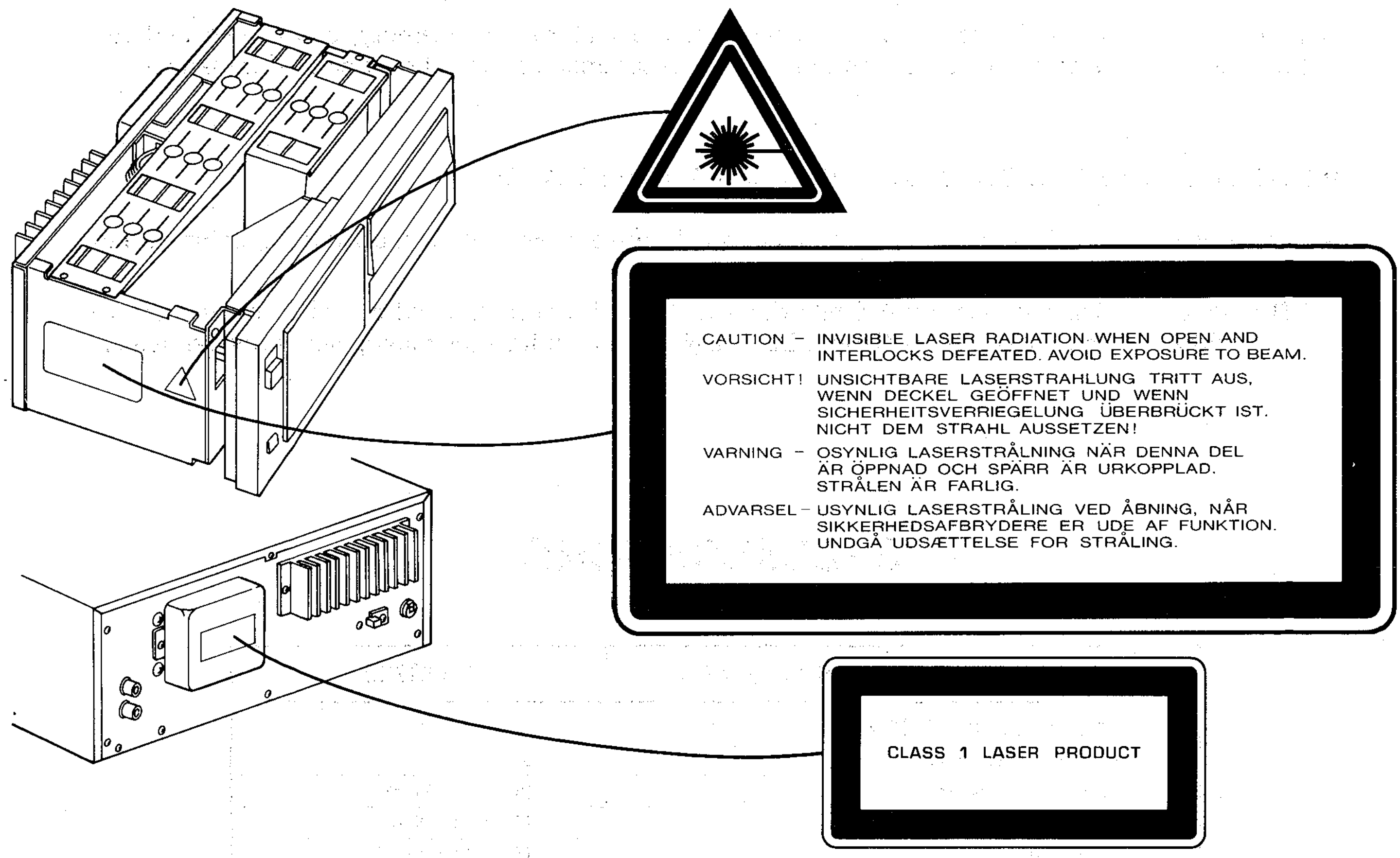
SPECIFICATIONS

DIGITAL COMPACT DISC PLAYER	AD-M700
AUDIO PERFORMANCE	
Number of Channels	2
Frequency Response	20 Hz – 20 kHz
Dynamic Range	More than 90 dB
S/N Ratio	More than 90 dB
Channel Separation	More than 90 dB
Distortion	Less then 0.006 % (1 kHz)
Wow and Flutter	Quartz crystal precision
SIGNAL FORMAT	
Sampling Frequency	44.1 kHz
Quantization	16 bits linear
Bit Rate	4.3212 million bit/sec.
DISC	
Diameter	120 mm (4-3/4") 500–200rpm (inside–outside)
Track Pitch	1.6 µm
Playing Time	60 min.
Tracking System	Non-Contact Solid State Laser Tracking at PCM Wavelength 0.78 µm
GENERAL	
Power Requirements (50/60 Hz)	AC 110/220 V 35 Watts
Dimensions (W x H x D)	336 x 139 x 278 mm
Weight (approx.)	7.1 kg

Because its products are subject to continuous improvement, Fisher Corporation reserves the right to modify product designs and specifications without notice and without incurring any obligation.

SAFETY CERTIFICATION

SICHERHEITSBESTIMMUNGEN / CERTIFICAT DE SÉCURITÉ / SAFETY CERTIFICATION SÄKERHETSFÖRESKRIFTER / VEILIGHEIDSCERTIFIKAAT



CAUTION – INVISIBLE LASER RADIATION WHEN OPEN AND INTERLOCKS DEFEATED. AVOID EXPOSURE TO BEAM.

VORSICHT! UNSICHTBARE LASERSTRAHLUNG TRITT AUS, WENN DECKEL GEÖFFNET UND WENN SICHERHEITSVERRIEGELUNG ÜBERBRÜCKT IST. NICHT DEM STRAHL AUSSETZEN!

VARNING – OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRR ÄR URKOPPLAD. STRÅLEN ÄR FARLIG.

ADVARSEL – USYNLIG LASERSTRÅLING VED ÅBNING, NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.

CLASS 1 LASER PRODUCT

ACHTUNG – WENN ANDERE ALS DIE HIER SPEZIFIZIERTEN BEDIENUNGS- ODER JUSTIEREINRICHTUNGEN BENÜTZT ODER ANDERE VERFAHRENS-WEISEN AUSGEFÜHRT WERDEN, KANN DIES ZU GEFÄHRLICHER STRAHLUNGS-EXPOSION FÜHREN.

ATTENTION – L'EMPLOI D'ORGANES DE COMMANDE OU DE RÉGLAGE, OU L'EXÉCUTION DE PROCÉDURES, AUTRES QUE CEUX SPÉCIFIÉS DANS LE MODE D'EMPLOI, PEUT PROVOQUER UNE EXPOSITION DANGEREUSE AU RAYONNEMENT.

CAUTION – USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

VARNING – BRUK AV KONTROLLER, JUSTERINGAR ELLER MONÖVRERING AV APPARATEN ANNAT ÄN HÄRI ANGIVNA KAN INNEBÄRA STRÅLNINGSRISK.

OPGELET – HET GEBRUIK VAN REGELAARS OF HET MAKEN VAN AFSTELLINGEN E.D. DIE NIET IN DEZE GEBRUIKSAANWIJZING ZIJN BESCHREVEN KAN LEIDEN TOT SCHADELIJKE STRALINGEN.

CAUTELA – L'USO DI COMANDI, AGGIUSTAMENTI O PROCEDIMENTI DIVERSO DA QUELLO QUI SPECIFICATO PUÒ DAR LUOGO AD ESPOSIZIONE A RADIAZIONI PERICOLOSE.

LASER-PRODUKT DER KLASSE 1

PRODUIT LASER DE CATÉGORIE 1

CLASS 1 LASER PRODUCT

OBS. LASER KLASS 1 ANVÄNDS I DENNA PRODUKT.

"LASER-TUOTE – LUOKKA 1"
SAA AVATA VAIN AMMATTIMIES
LEVYKOTELOON EI SAA LAITTAA VIERAITA ESINEITÄ

FUNCTIONAL CHECK

Check the following items in the numerical order to examine whether the unit is correctly functioning or not. If the following items are all satisfactory, it shows the normal function of the unit is obtained.

ORDINARY PLAY

No.	Operation	Function
1	Turn on the power switch.	SKIP L.E.D. and TRACK/INDEX L.E.D. on the display go on.
2	Press OPEN/CLOSE button.	SKIP L.E.D. goes out and the lid opens.
3	Put the disc in the compartment and push the top.	SKIP L.E.D. goes on and the lid closes.
4	Press START button once.	While the unit is searching a program, START L.E.D. goes on. TRACK No. 1 L.E.D. goes on. SKIP L.E.D. goes off and ORDINARY L.E.D. goes on. The track number appears on the display. SKIP L.E.D. goes on and the first program is reproduced.
5	Press STOP button.	The play stops. Only SKIP L.E.D. and TRACK/INDEX L.E.D. go on.
6	Press START button twice.	The same function as in item 4 is exercised except that the track number becomes "2" on the display and the second program is reproduced.
7	While the second program is being reproduced, press F FWD button (the same button as START button) twice.	TRACK No. 4 L.E.D. goes on and the fourth program is reproduced.
8	While the fourth program is being reproduced, press F BACK button twice.	While the unit is searching the program, F BACK L.E.D. goes on and the third program is reproduced.
9	Press F FWD button to skip to the last program on the disc.	The last program is reproduced.
10	Press SCAN/SKIP button.	The unit is set in "SCAN" mode and the SCAN L.E.D. goes on.
11	Press DISPLAY SEL. button.	TRACK TIME L.E.D. goes on. The time elapsed with the program is displayed.
12	Keep pressing F FWD button.	The time skips 10 – 30 seconds and the reproduction continues for 0.3 seconds. This is repeated until F FWD button is released.
13	Keep pressing F BACK button.	The time skip 10 – 30 seconds and the reproduction continues for 0.3 seconds. This is repeated until F BACK button is released.
14	Press REPEAT button.	REPEAT L.E.D. goes on.
15	Press DISPLAY SEL. button.	ABSOLUTE TIME L.E.D. goes on. The total time to reach the program is displayed.
16	Press DISPLAY SEL. button.	REMAINING TIME L.E.D. goes on. The remaining time of the disc is displayed.

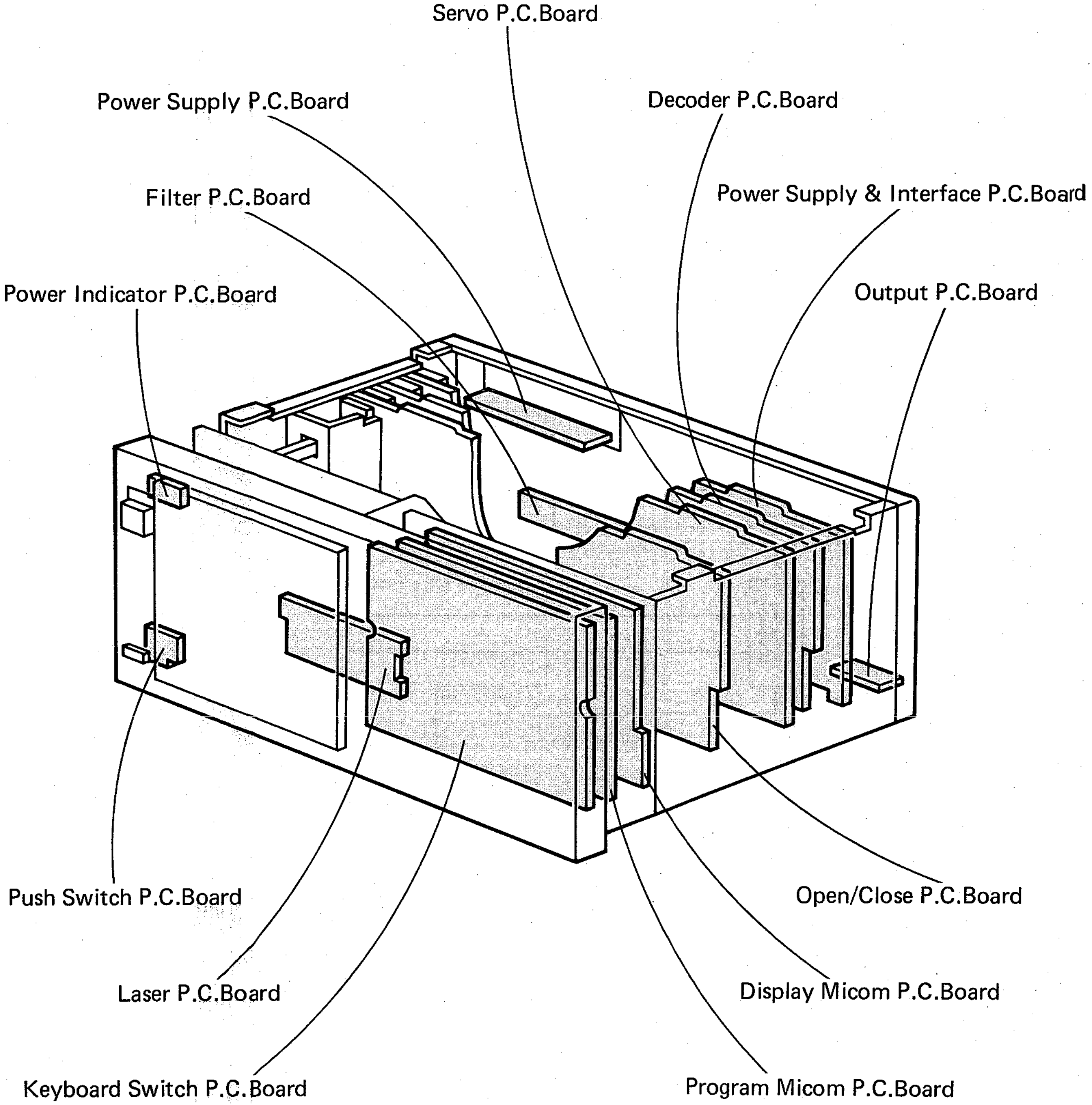
FUNCTIONAL CHECK (Continued)

No.	Operation	Function
17	Press F FWD button until the remaining time becomes 10 – 30 seconds and wait for all programs to end.	After the end of all programs, the reproduction starts with the first program again.
18	Press PAUSE button.	PAUSE L.E.D. goes on. The unit is set in "PAUSE" mode.
19	Press PAUSE button.	PAUSE L.E.D. goes out.
20	Press REPEAT button.	REPEAT L.E.D. goes out.
21	Set the unit in "SKIP" mode and press F FWD button until the last program is reached.	
22	Set the unit in "SCAN" mode and press F FWD button until the remaining time becomes 10 – 30 seconds. Then, wait for all programs to end.	After the end of all programs, the unit is set in "STOP" mode.

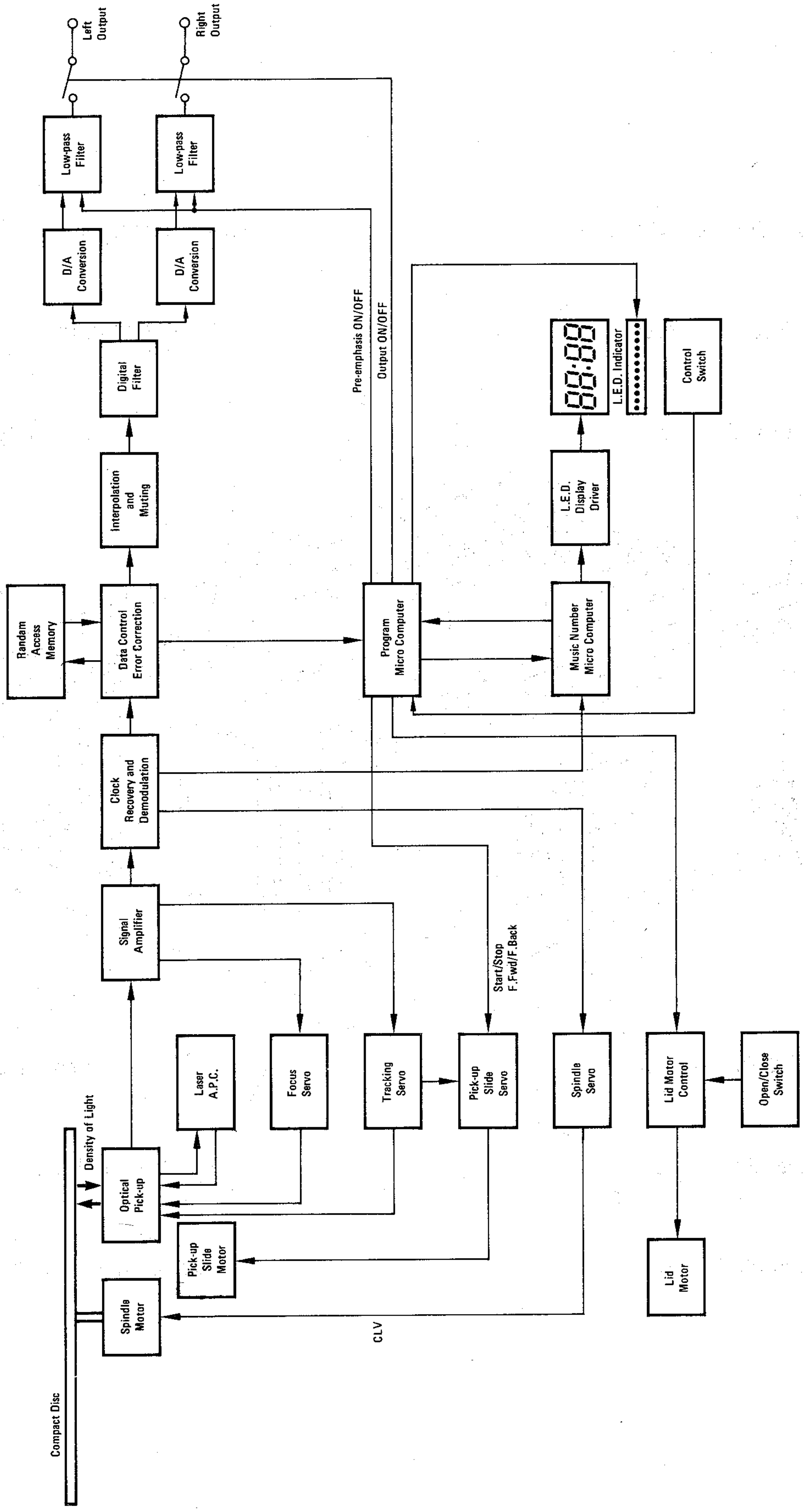
PROGRAM PLAY

No.	Operation	Function
23	Press PROGRAM MEMORY button "11", "8", "5", "3", and "1". (Use a disc on which more than eleven programs are recorded.)	Each TRACK No. L.E.D. goes on in the sequential order.
24	Press START button.	PROGRAM L.E.D. goes on. The eleventh program is reproduced. TRACK No. 11 L.E.D. flashes.
25	Press F FWD button four times.	The first program is reproduced. TRACK No. 1 L.E.D. flashes.
26	Press F BACK button three times.	The fifth program is reproduced. TRACK No. 5 L.E.D. flashes.
27	Press F FWD button four times.	The eighth program is reproduced. TRACK No. 8 L.E.D. flashes.
28	Press F BACK button three times.	The eleventh program is reproduced. TRACK No. 11 L.E.D. flashes.
29	Press OPEN/CLOSE button during reproduction.	The reproduction stops. The lid opens and disc is gradually elevated.
30	Press OPEN/CLOSE button.	The disc is set in place.
31	Press PROGRAM MEMORY button sequentially from 1 to 10.	Each TRACK No. L.E.D. goes on in the sequential order.
32	Press C button ten times.	Each TRACK No. L.E.D. goes out in the reverse order of item 31.
33	Press PROGRAM MEMORY button from 11 to 20.	Each TRACK No. L.E.D. goes on in the sequential order.
34	Press STOP button.	All TRACK No. L.E.D. go out and the memory is cleared.

P.C.BOARD LOCATION


Servo P.C.Board
Power Supply P.C.Board
Decoder P.C.Board
Filter P.C.Board
Power Supply & Interface P.C.Board
Power Indicator P.C.Board
Output P.C.Board
Push Switch P.C.Board
Open/Close P.C.Board
Laser P.C.Board
Display Micom P.C.Board
Keyboard Switch P.C.Board
Program Micom P.C.Board

FUNCTIONAL BLOCK DIAGRAM


Compact Disc
Density of Light
Optical Pick-up
Spindle Motor
Pick-up Slide Motor
Laser A.P.C.
Focus Servo
Tracking Servo
Pick-up Slide Servo
Spindle Servo
Lid Motor Control
Open/Close Switch
Lid Motor
CLV
Start/Stop F.Fwd/F.Back
Signal Amplifier
Clock Recovery and Demodulation
Data Control Error Correction
Random Access Memory
Interpolation and Muting
Digital Filter
D/A Conversion
D/A Conversion
Low-pass Filter
Low-pass Filter
Left Output
Right Output
Pre-emphasis ON/OFF
Output ON/OFF
Program Micro Computer
Music Number Micro Computer
L.E.D. Display Driver
88:88
L.E.D. Indicator
Control Switch

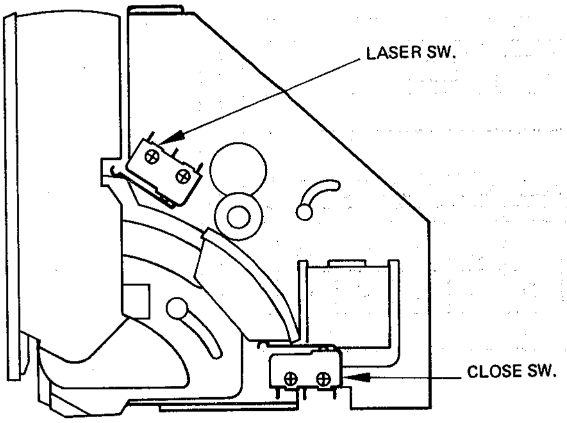
SAFETY INTERLOCK

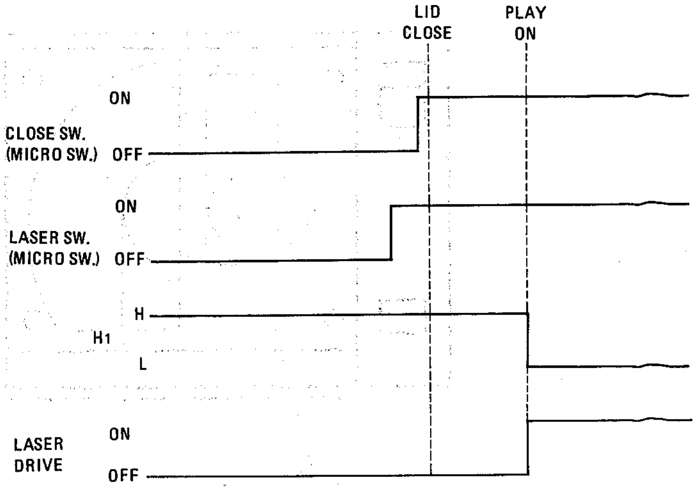
The model of AD-M700 is equipped with a safety circuit that prevents the laser from radiating to the outside of the unit unless the following three conditions are satisfied.

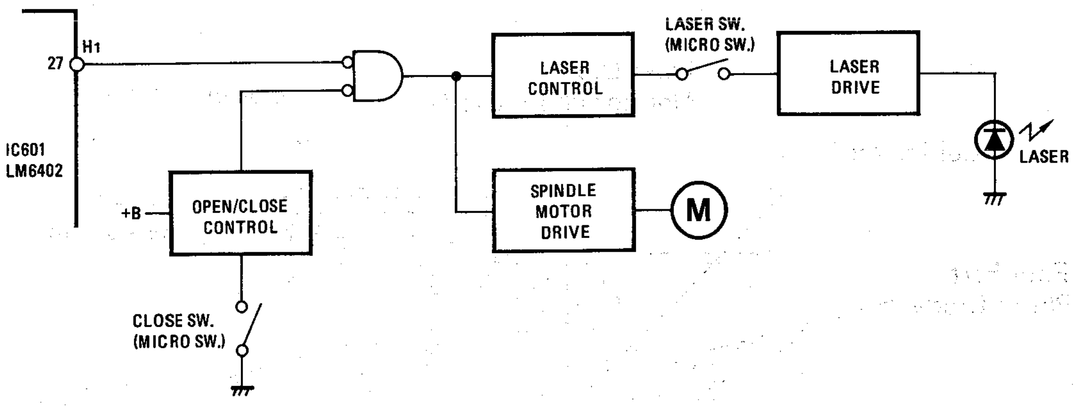
The conditions;

1. The lid closes and the CLOSE switch (MICRO switch) is "ON".
2. The lid closes and the LASER switch (MICRO switch) is "ON".
3. Pin No. 27 (H1) of IC601 (LM6402) will be "LOW".

The following TIME CHART shows the sequence of operation of the safety circuit;


LASER SW.
CLOSE SW.

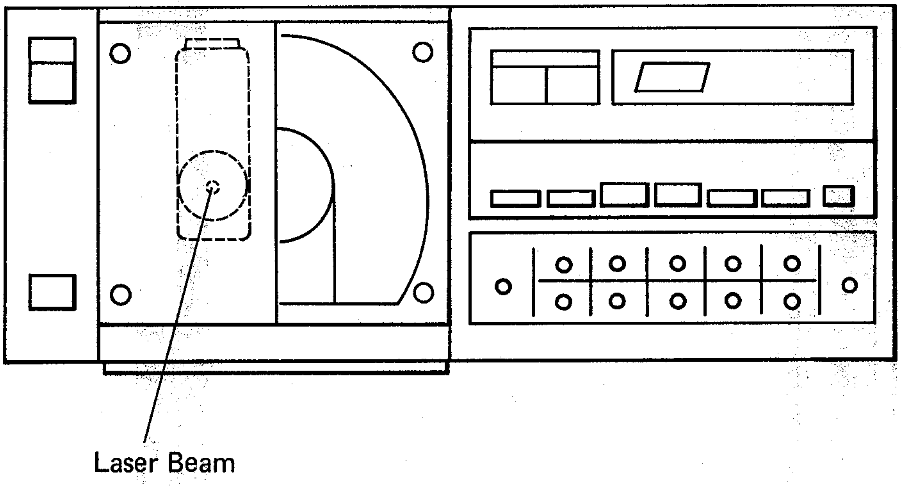


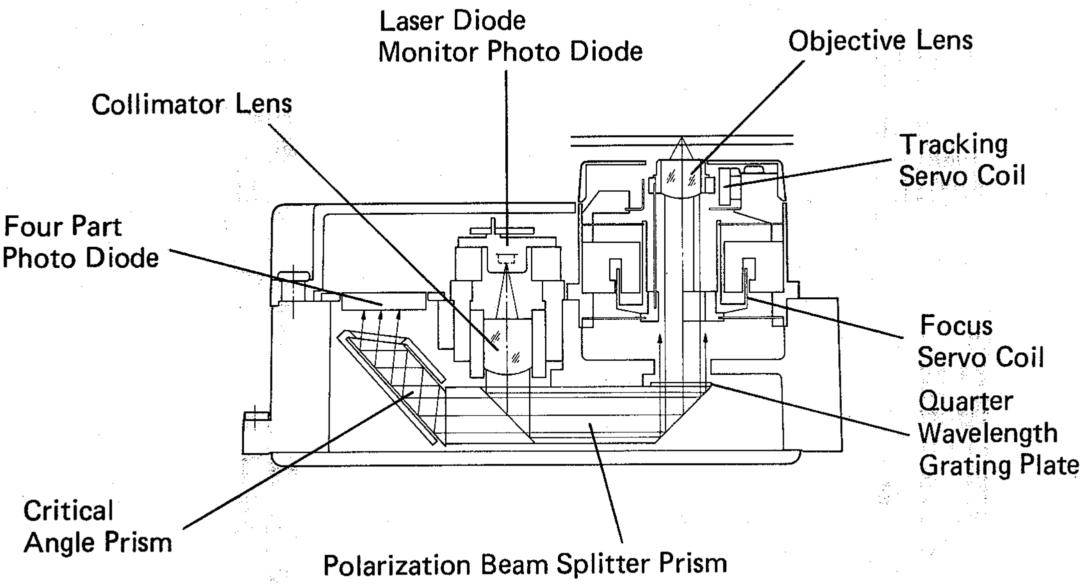

27
H1
IC601 LM6402
+B
OPEN/CLOSE CONTROL
CLOSE SW. (MICRO SW.)
LASER CONTROL
LASER SW. (MICRO SW.)
LASER DRIVE
LASER
SPINDLE MOTOR DRIVE
M

While the lid is closing after inserting a disc, the LASER switch will be "ON" first and then the CLOSE switch will be "ON", then the lid closes completely.
Press the PLAY button and Pin No. 27 of IC602 will be "LOW" which causes the laser to radiate.

LASER BEAM SIGNAL FLOW WITHIN OPTICAL PICKUP

Laser Diode Properties
Material: Ga-Al-As
Wavelength: 775 – 830nm (23°C)
Laser Output: max. 1.0 mW
Classification: Class IIIb equivalent




Laser Diode
Monitor Photo Diode
Objective Lens
Collimator Lens
Tracking
Servo Coil
Four Part
Photo Diode
Focus
Servo Coil
Quarter
Wavelength
Grating Plate
Critical
Angle Prism
Polarization Beam Splitter Prism

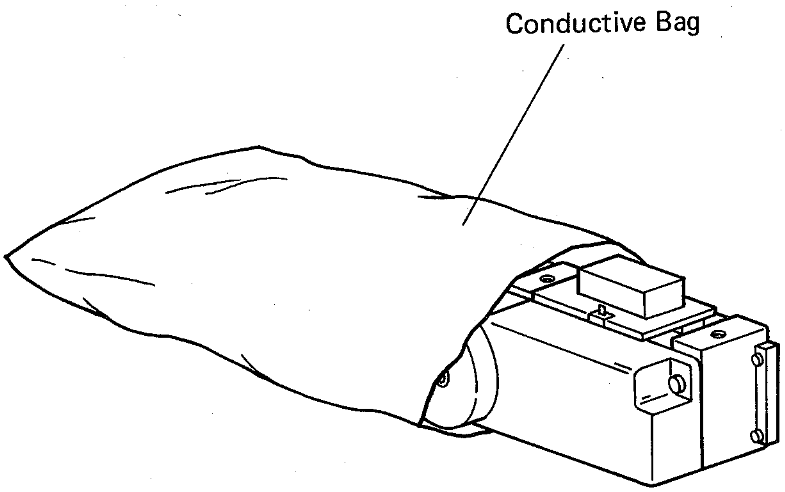
The construction of Optical Pickup.

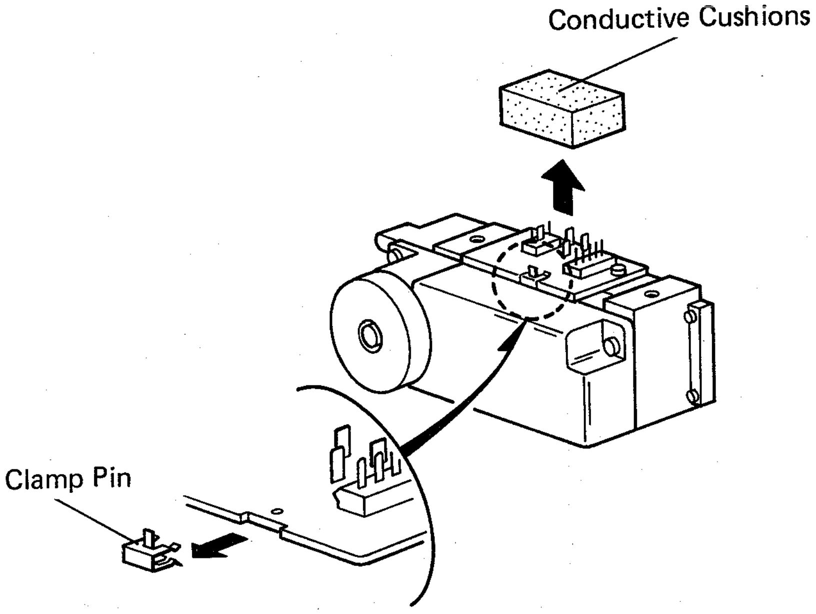
USE EXTREME CAUTION WHEN HANDLING PICKUP

Since the laser diode built into the pickup is very susceptible to damage by static electricity, it is packaged as a service part in the following manner.

- In an electrically conductive bag with conductive cushions attached to the terminals of the printed circuit board.
- Clamp pins are inserted in the laser diode terminals creating a short circuit between the terminals.

CAUTION: Do NOT remove the clamp pins until the pickup has been installed and the terminals have been connected. Be sure NOT to remove them during the replacement work. Solder the pickup terminals with an antistatic soldering iron at the pickup replacement.





Carefully read and follow the instruction packed with the pickup when handling the pickup.

Instructions included with the Replacement Parts

CAUTION ON HANDLING THE PICKUP

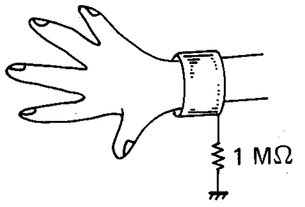
When opening or repairing the pick-up, the procedure for grounding as follows is required to prevent damage caused by static electricity.

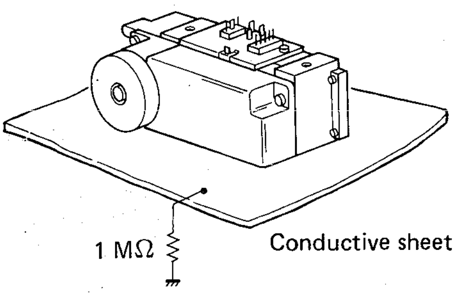
1 Grounding for the human body
Be sure to put on a wrist-strap for grounding (with impedance lower than 1 MΩ) whose other end is grounded. The strap works to drain away the static electricity build-up on the human body.

2 Grounding for the work table
Be sure to lay on the table a conductive sheet (with impedance lower than 1 MΩ) such as a sheet of copper, which is grounded.

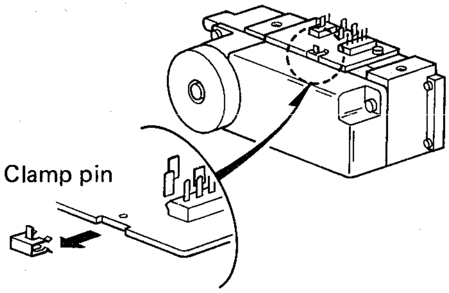
3 As static electricity build-up on clothes is not drainded away, be careful not to let your clothes touch the pick-up.

Wrist-strap for grounding





Remove the clamp pin for short-circuit after the pick-up has been replaced and each terminal has been connected. Be sure not to remove them during the replacement work.



TS 83-06-001

The following method is an example for reference purposes:

1. Place a conductive sheet on the workbench.
2. Place the set on the conductive sheet so that the chassis touches the sheet. (This makes it the same potential as the conductive sheet.)
3. Place your hands on the conductive sheet. (This makes them the same potential as the sheet.)
4. Remove the optical system block from the conductive bag.
5. Perform work on top of the conductive sheet.
   Be careful that clothing does not touch the optical pickup block.

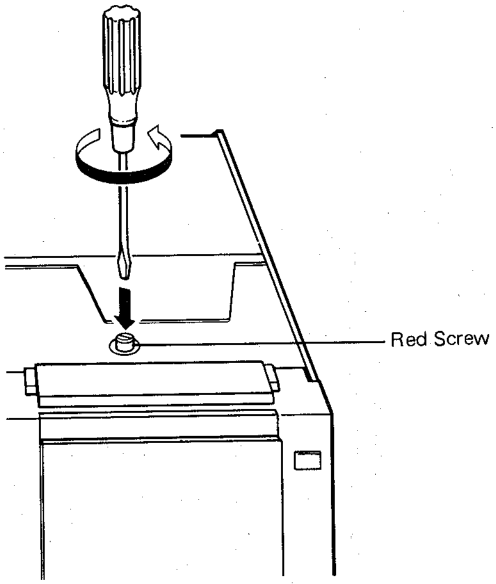
PREPARATION BEFORE OPERATION

Before Use

Use a flat blade screwdriver to turn the red fixing screw located on the bottom of the unit. Loosen the screw by turning it counterclockwise more than five times. However, this screw cannot be removed.
Secure the screw in case any subsequent transportation of the unit is required.

Before Transporting the Unit

1. Depress the POWER switch to the ON position.
2. Press the STOP/RESET button.
3. Release the POWER switch to the OFF position.
4. Secure the red fixing screw.



CONNECTING THE DIGITAL COMPACT DISC PLAYER

Connections on the Rear Panel

1. LINE OUT Jacks

   Connect one end of the patch cords (supplied) to the OUTPUT jacks of the unit and the other end to the jacks designated by CD, DAD, AUX, TAPE PLAY, T.V., TUNER, etc., of the amplifier. Do not connect to the PHONO jacks.
   Do not confuse the right (R) and left (L) cords when making connections. The white plug is for the left channel and the red plug is for the right channel.

2. SYNCHRO OUT Connection

   When the unit is used in combination with the AUTO FUNCTION/SYNCHRO REC jack on the amplifier CA-M700, the supplied mini-plug cable is connected to the SYNCHRO OUT jack. When the unit is used in combination with any other amplifier, the auto function will not operate and there is no need to connect the mini-plug cable.

3. AC SELECTOR Switch

   This unit has been factory-adjusted for operation on 220V AC. The voltage can be changed for operation on 110V AC by making the following changes to the AC selector (Please strictly follow our instructions.):

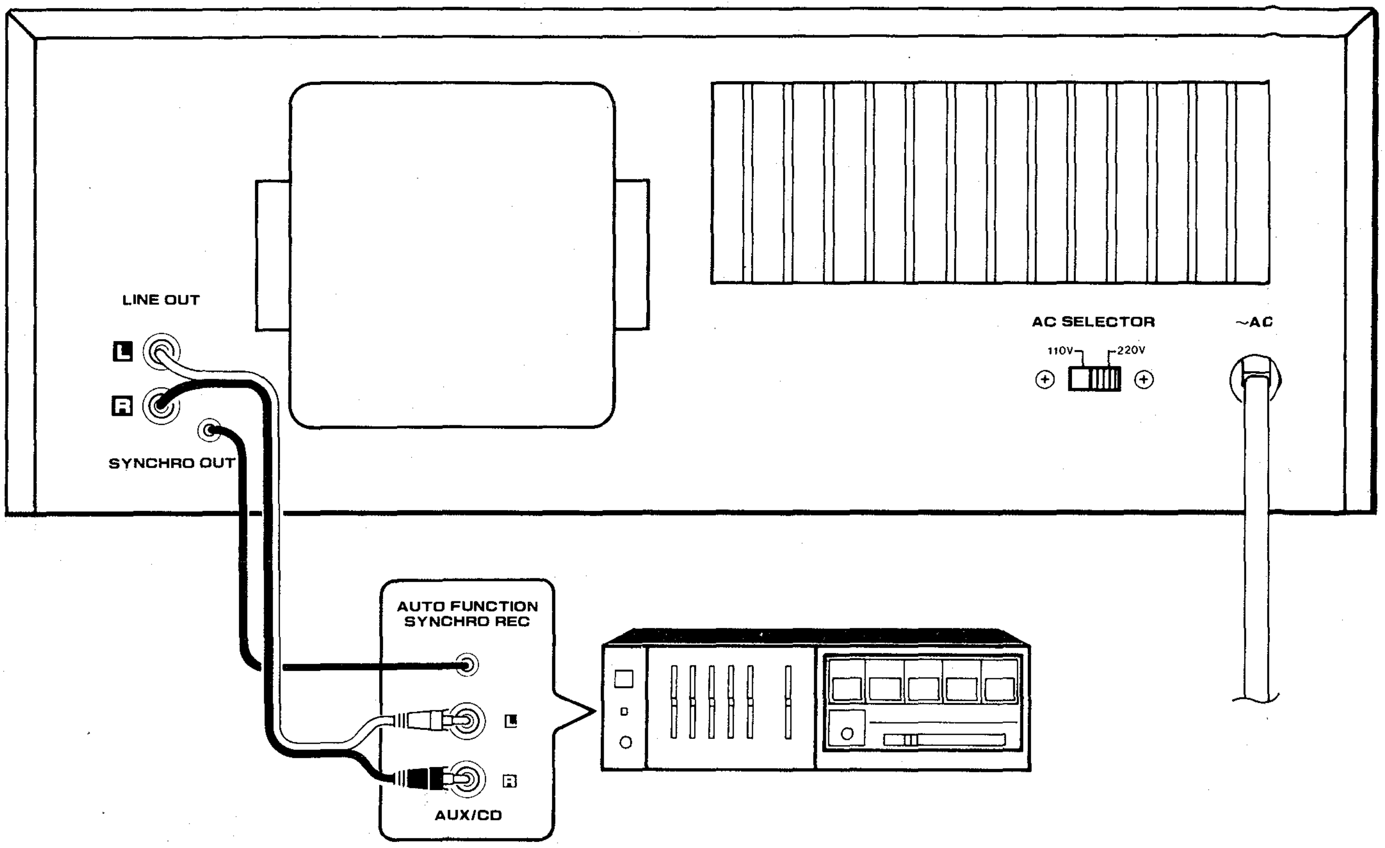
   - Remove the AC plug from the wall outlet.
   - Remove the screw holding the switch safety plate.
   - Switch the AC selector to 110V.
   - Replace the screw without the safety plate and tighten it.
   - Remove the second screw, place the safety plate on it and replace it, tightening it fully.

   DO NOT remove both screws at the same time!

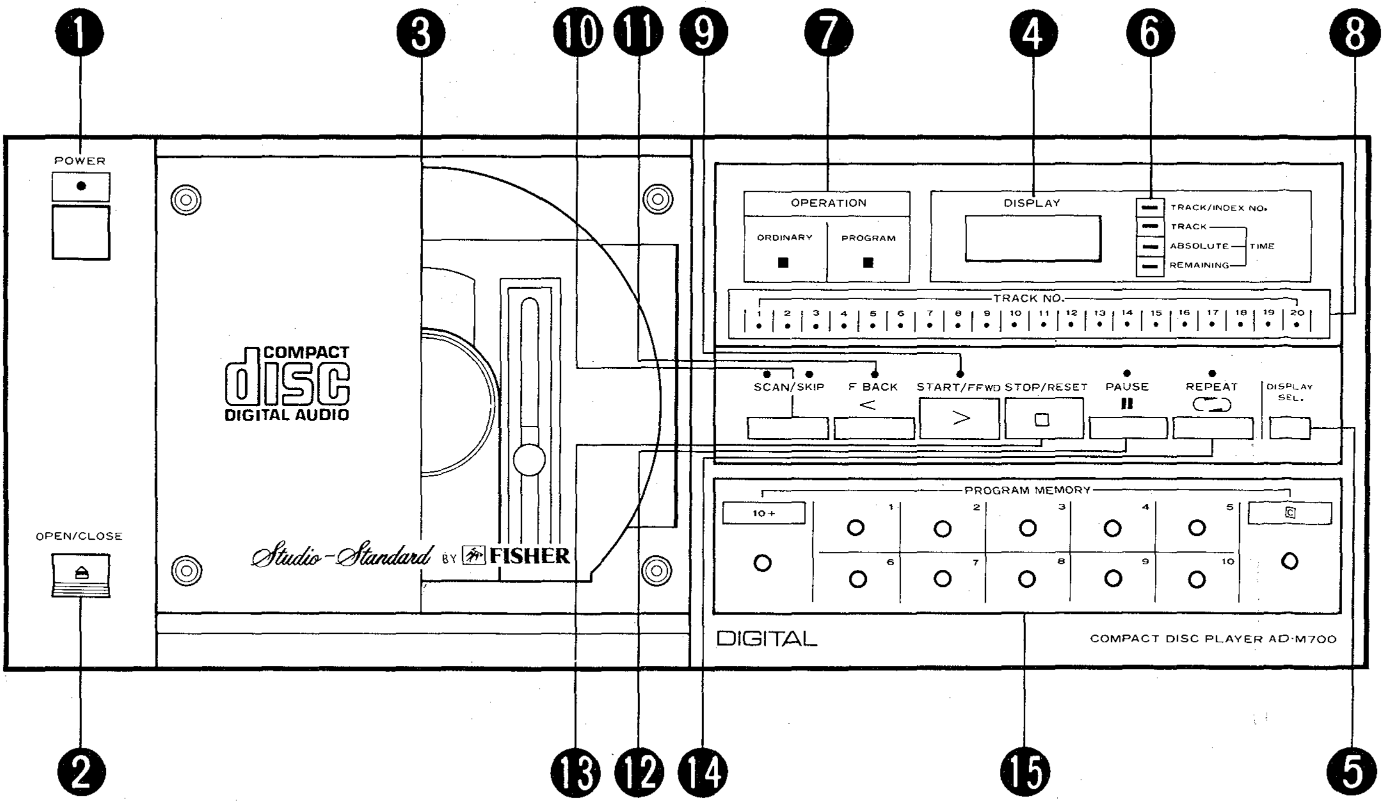
   The unit is now ready for 110V operation. DO NOT attempt to operate the unit on 220V with the AC selector switch in the 110V position. Damage will result!

4. AC (Power Cable)

   After completing all connections and installations, plug the power cord into the wall outlet with the proper AC voltage.


LINE OUT
L
R
SYNCHRO OUT
AC SELECTOR
110V
220V
~AC
AUTO FUNCTION
SYNCHRO REC
L
R
AUX/CD

CONTROL AND OPERATION


1
3
10
11
9
7
4
6
8
POWER
OPEN/CLOSE
COMPACT
disc
DIGITAL AUDIO
Studio-Standard BY FISHER
OPERATION
ORDINARY
PROGRAM
DISPLAY
TRACK/INDEX NO.
TRACK
ABSOLUTE
TIME
REMAINING
TRACK NO.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
SCAN/SKIP
F BACK
START/FFWD
STOP/RESET
PAUSE
REPEAT
DISPLAY SEL.
PROGRAM MEMORY
10+
1 2 3 4 5
6 7 8 9 10
C
DIGITAL
COMPACT DISC PLAYER AD-M700
2
13
12
14
15
5

POWER Switch and Indicator

Set the VOLUME control of your amplifier to the position marked "0" (minimum) before switching on the power.

By gently depressing the POWER switch, the unit is switched on. Simultaneously, the POWER, TRACK/INDEX NO. and SKIP indicators will light up. To switch the power off, release the switch by depressing it again.

. OPEN/CLOSE Button

Press to open the disc holder. A disc can then be inserted or removed. Press to close the disc holder or simply push on the disc holder at top center.

. Disc Holder

Holds a disc for playback. Open or close it by pressing the OPEN/CLOSE button. When a disc is gently pushed into the disc holder, it automatically closes.

. DISPLAY Counter

Shows any one of the following selected display modes:

- The TRACK/INDEX NO. indicator will light up and the counter displays the track number being played and the index number for parts within selections (movements in classical music, etc.).
- The TRACK TIME indicator will light up and the counter displays the time for each selection in minutes and seconds.
- The ABSOLUTE TIME indicator will light up and the counter displays the total time for all selections already played back in minutes and seconds.
- The REMAINING TIME indicator will light up and the counter displays the remaining time for the unplayed selections in minutes and seconds.

5. DISPLAY SELECTOR Button

Selects the mode for the DISPLAY counter. The mode changes in order each time the button is pressed.

6. Display Mode Indicators

Indicate any one of the four display modes successively in order each time the DISPLAY SELECTOR button is pressed.
When the POWER switch is initially depressed, the TRACK/INDEX NO. indicator will light up.

7. OPERATION Indicators

- ORDINARY indicator: Lights up for ordinary play.
- PROGRAM indicator: Lights up for programmed play.

8. TRACK NO. Indicators

Indicate the number of the selection being played back or all programmed numbers of the selection.
During programmed play, the indicator for the selection being played back will flash.

NOTE:
This player has 2 displays which indicate the selection number. These displays are DISPLAY counter (when set to the TRACK/INDEX NO. mode), and the TRACK NO. indicators. Generally, these displays show the same selection number. Discs however may contain numbers indicating the order of recorded selections on the disc, called "POINT," along with numbers indicating the total number of recorded tracks (track numbers). These track numbers are added at the option of the disc manufacturer.

For example, in a 3-disc album containing 45 selections, the first disc might have selections 1 – 15, the second might have 16 – 30, and the third disc might contain 31 – 45, and corresponding track numbers may be assigned to these selections. With this kind of album, when the first selection (POINT 1) of the second disc is played, the DISPLAY counter will indicate track number 16, the TRACK NO. indicators will show the "POINT," namely number 1.

9. START/FFWD Button and Indicator

Press to play a disc. When pressed, its indicator will light up. The player quickly advances to the beginning of the desired selection skipping the same number of selections as the number of times the button is pressed during play in SKIP mode. It also quickly advances while being pressed during ordinary play in SCAN mode.

10. SKIP/SCAN Selector Button and Indicators

This button selects either the SKIP or SCAN mode when pressed during ordinary play.
After the POWER switch has been depressed, and this button is pressed once, the indicator is changed from SKIP to SCAN mode, and the first selection begins to play.

SKIP indicator: Lights up when the POWER switch is depressed or this button is pressed twice.
SCAN indicator: Lights up when this button is pressed once.

11. F BACK Button and Indicator

The player quickly reverses to the beginning of the desired selection skipping the number of selections corresponding to the number of times the button is pressed minus one during play in SKIP mode, and its indicator lights up. It also quickly reverses while being pressed during ordinary play in SCAN mode.

12. PAUSE Button and Indicator

This button temporarily stops play when pressed and its indicator will light up. Press the PAUSE button again to resume play.

13. STOP/RESET Button

Stops rotation of the disc, and resets the SCAN, PAUSE and REPEAT functions when pressed.
Resets an entire program in programmed play.

14. REPEAT Button and Indicator

Repeats play when pressed and its indicator lights up.

15. PROGRAM MEMORY Buttons

Used to designate the selection number when programming. The designated TRACK NO. indicators will light up within 10 selections in total.
When inputting numbers from 11 to 20, press the "10+" button and then one of the 1 to 10 buttons. If a button is pressed in error, press the "C" button and then the desired button. The programmed selections are canceled in reverse programmed order each time the "C" button is pressed.

OPERATION

For Ordinary Play

1. Switch on the power to the amplifier. (When the player is used without the automatic function system, select the input source on the amplifier to which the player is connected.)
2. Depress the POWER switch. Simultaneously, the POWER indicator, TRACK/INDEX NO. indicator and SKIP indicator will light up.
3. Insert a disc.
4. Press the START/FFWD button and its indicator will light up. The disc will begin to rotate. The SKIP indicator will then go out, the ORDINARY indicator will light up, the DISPLAY counter will indicate "0 - 0" at the beginning of the first selection, and the track number and index number will be shown. The SKIP indicator will light up again, the START/FFWD indicator will go out, and the first selection will begin playing. When last selection is finished, the player will automatically stop.
5. When play is finished and the unit is not going to be immediately used again, open the disc holder, remove the disc, close the disc holder, and release the POWER switch to switch off the power.

When Stopping Play Part Way Through

- Press the STOP/RESET button. The disc will stop rotating and play will stop.
- **When removing the disc**
  Press the OPEN/CLOSE button. The disc will stop rotating and the disc holder will open.
- **When pausing**
  When the PAUSE button is pressed, the player will temporarily stop and its indicator will light up. (The disc will continue to rotate.) To cancel the pause, press the PAUSE button again, its indicator will go out, and play will begin from where it was stopped.

Fast Forward In SCAN Mode

When the START/FFWD button is pressed during ordinary play, the player will quickly advance toward later selections while the button is being pressed. When the button is released, play will begin again from that point.

Fast Backward In SCAN Mode

When the F BACK button is pressed during ordinary play, the player will quickly reverse toward earlier selections while the button is being pressed. When the button is released, play will begin again from that point.
If fast backward is continued to the beginning of the disc, the DISPLAY counter will indicate "0 - 0" (when the TRACK/INDEX NO. indicator lights up) and the player will pause. When the button is released, play will begin.

NOTE:
When the PAUSE button has been pressed, fast forward or fast backward cannot be activated.

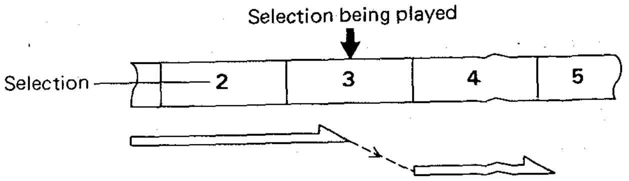
Selection Search In SKIP Mode

By using the START/FFWD and F BACK buttons, the beginning of a desired selection can easily be found. The number of the selection is displayed on one of the TRACK NO. indicators.

When Going to the Next Selection during Play

Press the START/FFWD button once.

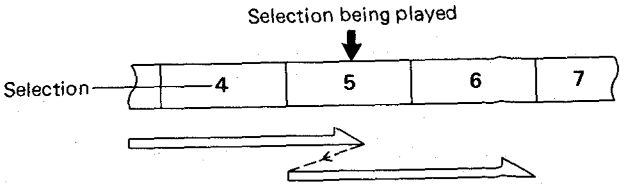
Example:



When Going to the Beginning of the Selection Being Played

Press the F BACK button once.

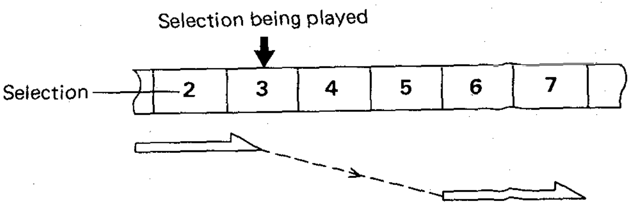
Example:



When Going Ahead Several Selections

Example: The beginning of the 3rd selection from that being played.
Press the START/FFWD button the number of times necessary to indicate "6" on the TRACK NO. indicators (3 times).

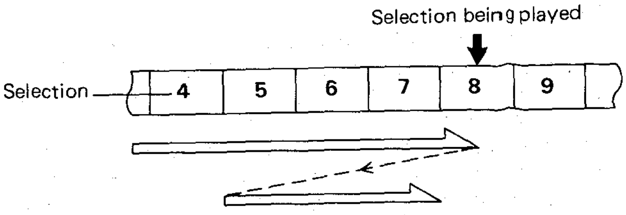
Example: Beiginning of 3rd selection from that being played



When Going Back Several Selections

Example: The beginning of the 3rd selection before that being played.
Press the F BACK button the number of times necessary to indicate "5" on the TRACK NO. indicators (4 times).

Example: Beginning of 3rd selection before that being played



epeated Play

/hen Repeating All Selections on a Disc (Ordinary Play)

. Press the REPEAT button and its indicator will light up. The REPEAT button also functions when pressed during play.

: Press the START/FFWD button.

: To cancel repeated play, press the REPEAT button once again and its indicator will go out.

?epeated Play of Programmed Selections

Vhen the desired selections have been pre-programmed refer to the Programmed Play section), the programmed ›elections in programmed order will be played repeatedly vhen the REPEAT button is pressed.

›rogrammed Play

Jp to 10 selections within a number range of 1 to 20 can ›e programmed to play in any order.

Vhat is Programmed Play?

Suppose you have a disc with 16 selections on it. Programmed play allows you to arrange any 10 of the selections you want to listen to in the order you want to listen to them.

Example

In this example of programmed play, five of the 16 selections are included. A selection cannot be programmed to play more than once.

There are 10 positions available for programming, so programmed play with selections in 10 positions is possible. Before programmed play can begin, it is necessary to program the order of the selections in the player.

When inputting numbers from 11 to 20

Example: To input track number 15, press the "10+" button and then the "5" button.

NOTE:

This player will not allow you any programming without a disc in the player or during ordinary play.

When 10 positions are stored, other selections will not be indicated on the TRACK NO. indicators.

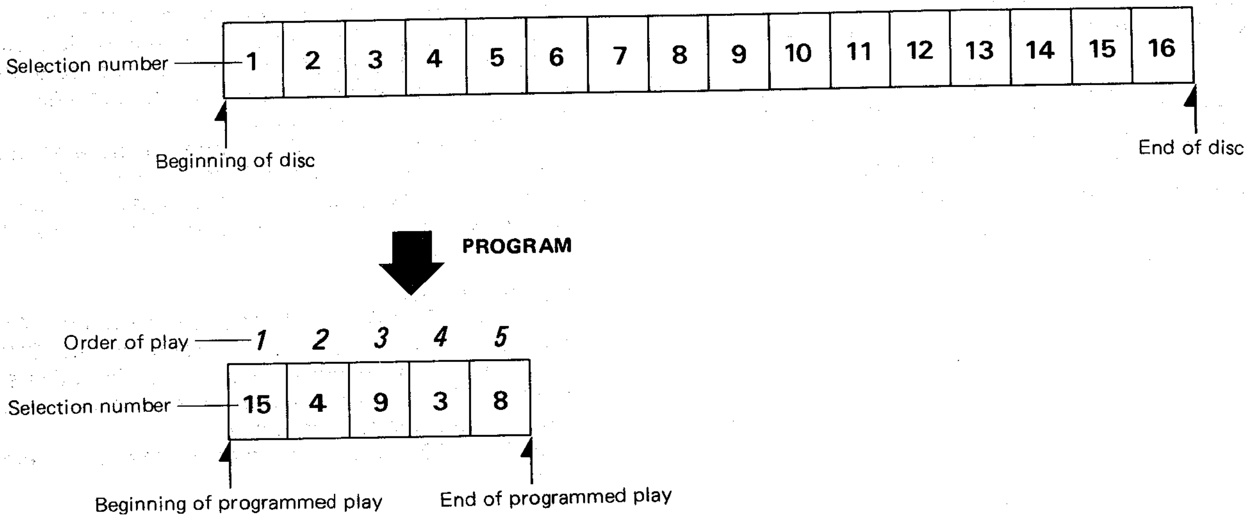
In Order to Cancel (Clear) an Entire Program

Press the STOP/RESET button. This operation is effective only when the player is in the program input mode (PROGRAM MEMORY button pressed).

Programming and Beginning Programmed Play

1. Switch on the power to the amplifier. (When the player is used without an automatic function system, select the input source on the amplifier to which the player is connected.)
2. Depress the POWER switch. Simultaneously, the POWER indicator, TRACK/INDEX NO. indicator and SKIP indicator (when the disc holder is closed) will light up.
3. Insert a disc.
4. Program the selections you want to hear and their order of play.
5. If you want to listen to the selections in order of 15, 4, 9, 3 and 8, press the PROGRAM MEMORY buttons in order of 10+, 5, 4, 9, 3 and 8. The TRACK NO. indicators in the order of 15, 4, 9, 3 and 8 will light up. The disc will begin to rotate.
6. If pressed in error, for example 7 instead of 8, press the PROGRAM MEMORY buttons in the order of C, 8, then the TRACK NO. indicator will be correctly changed from 7 to 8.
7. Press the START/FFWD button and the PROGRAM indicator will light up. Play will begin from the track number 15 selection. During programmed play, the TRACK NO. indicator will flash the track number being played back.
   The START/FFWD button functions in any mode.
8. If the START/FFWD button is pressed once while the 9th selection is being played, play will begin on the 3rd selection; if pressed twice, play will begin on the 8th selection.
9. If the F BACK button is pressed once while the 9th selection is being played, play will begin at the start of the 9th selection; if pressed twice, play will begin on the 4th selection.
10. If the REPEAT button is pressed, the selections will be played repeatedly in the same order in which they have been programmed.
11. If you wish to stop play temporarily, press the PAUSE button and its indicator will light up. Press it again to resume play.
12. If all programs are to be cleared and reset, press the STOP/RESET button.
13. When the last programmed selection has been played, the player will automatically stop.

When programming a selection that is not included in the actual disc (such as track number 20 for the example above), its TRACK NO. indicator lights up. When the START/FFWD button is pressed, the indicator will go out.



Operation during Programmed Play

- The START/FFWD and F BACK buttons advance and reverse the player to the beginning of the next selection and the previous selection respectively, according to the programmed order.
- The STOP/RESET button returns the player from programmed play to ordinary play.
- The REPEAT button repeats programmed play in the programmed order.
- The PAUSE button operates as in ordinary play. To play again after a pause, press the PAUSE button again.

NOTE:
When the unit is switched off, the entire program will be canceled.

AUTOMATIC FUNCTION SYSTEM AND SYNCHRO RECORDING

Automatic Function System and Synchro Recording

When the player AD-M700 is used in combination with the optionally available amplifier CA-M700, tuner FM-M700, turntable MT-M700 and cassette deck CR-M700, the automatic function and synchro (simultaneous) recording function can be used to full advantage.

Automatic Function System:

To operate, press the START/FFWD button on the player to listen to a disc. The FUNCTION selector on the amplifier is automatically set to the AUX/CD position. It is not necessary to set the position of the FUNCTION selector each and every time.

When the tuner's preset station button, turntable's START button or cassette deck's PLAY button is pressed while you are listening to a disc, the broadcast reception, record play or tape play mode is established. Simultaneously, the player's START/FFWD button is released, the OPERATION indicator goes off and the disc stops rotating.

Synchro Recording:

When music from a disc is being recorded, the cassette deck's PAUSE and SPACE PAUSE functions are released or activated in synchronization with the player's DISPLAY indication.

1) Insert a cassette into the cassette deck.
2) Press the RECORD button on the cassette deck. Simultaneously, the PLAY and PAUSE functions are activated automatically and the recording standby mode is established.
3) Insert a disc, then press the START/FFWD button on the player, select the program number which is to be recorded and play it. At the same time as the disc begins play, the PAUSE function on the cassette deck is automatically released and the recording mode is established.

To Interrupt Recording during Ordinary Play . . .

1) Press the PAUSE button on the player. At the same time as the disc temporarily stops play, the SPACE PAUSE function on the cassette deck is automatically activated, a silent space (unrecorded portion) of approximately 4 seconds is provided and the pause mode is established.

   NOTE:
   If the PAUSE button on the player is pressed during programmed play, the PAUSE function on the cassette deck will not be activated and the cassette deck will remain in the recording mode.
2) Press the PAUSE button on the player again to resume recording. At the same time as the disc begins play, the PAUSE function is released and the deck is returned to the recording mode.

NOTE:

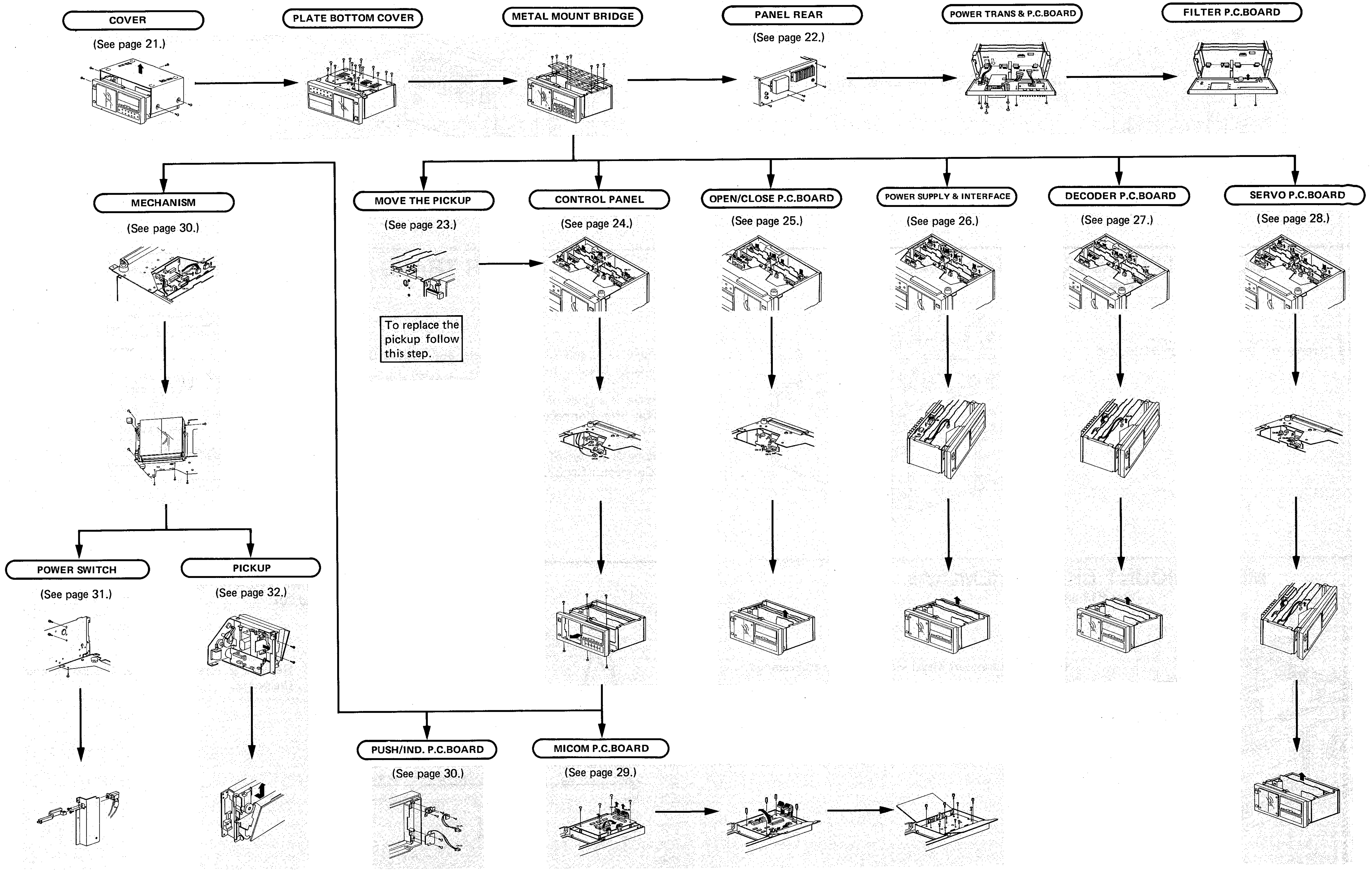
- If the disc begins play during the time the cassette deck's SPACE PAUSE function is operating automatically, the recording mode will be established in the pause mode and operation will not synchronize properly. If this occurs, operate the recording in the manual mode.
- If the PAUSE button on the cassette deck is pressed in error, the pause mode will be established with the play mode still operational. When the PAUSE button on the player is pressed and the disc temporarily stops play, the recording mode will be established and operation will not synchronize properly.
- When the PAUSE button on the cassette deck has been pressed in error, either press the PAUSE button again or press the STOP button on the cassette deck, release the pause mode and then proceed again with the synchro recording operation.
- When the SYNCHRO REC button on the amplifier is pressed during recording with its indicator off, operation will not synchronize properly even when the START/FFWD button on the player is pressed and the disc begins play.

To Stop Recording . . .

1) Press the STOP/RESET button on the player. At the same time as the disc stops rotation, the SPACE PAUSE function on the cassette deck is activated, a silent space of approximately 4 seconds is created and the pause mode is established.
2) Press the STOP button on the cassette deck to release the pause mode.

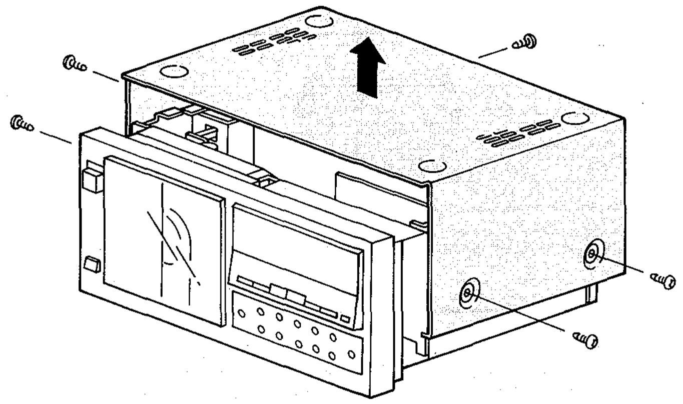
DISASSEMBLY SEQUENCE

See the pages referenced in each block for the details in disassembly procedures.


COVER
(See page 21.)
PLATE BOTTOM COVER
METAL MOUNT BRIDGE
PANEL REAR
(See page 22.)
POWER TRANS & P.C.BOARD
FILTER P.C.BOARD
MECHANISM
(See page 30.)
MOVE THE PICKUP
(See page 23.)
To replace the pickup follow this step.
CONTROL PANEL
(See page 24.)
OPEN/CLOSE P.C.BOARD
(See page 25.)
POWER SUPPLY & INTERFACE
(See page 26.)
DECODER P.C.BOARD
(See page 27.)
SERVO P.C.BOARD
(See page 28.)
POWER SWITCH
(See page 31.)
PICKUP
(See page 32.)
PUSH/IND. P.C.BOARD
(See page 30.)
MICOM P.C.BOARD
(See page 29.)

COVER REMOVAL

(See P19 and 20)

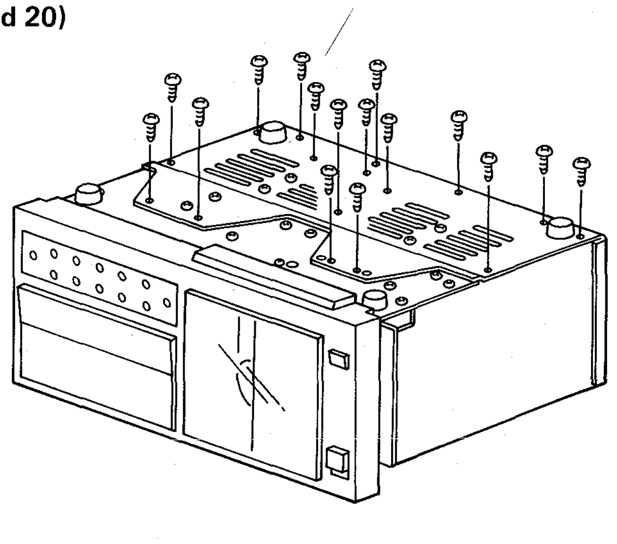


Remove 5 screws of the Cover, lift up the Cover and then remove it.

BOTTOM PLATE COVER REMOVAL

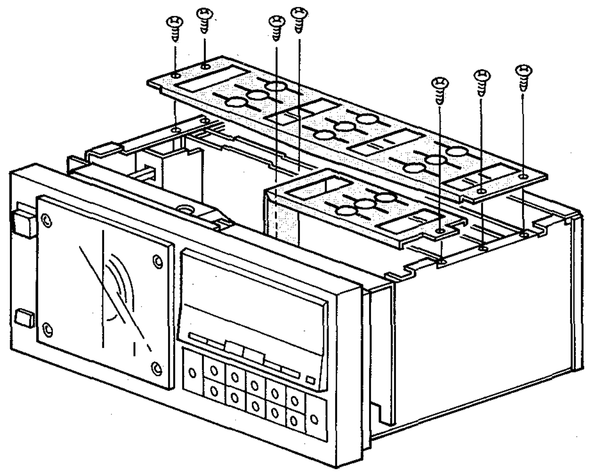
(See P19 and 20)

Remove 16 screws of Bottom Cover Plate and remove it.



METAL MOUNT BRIDGE REMOVAL

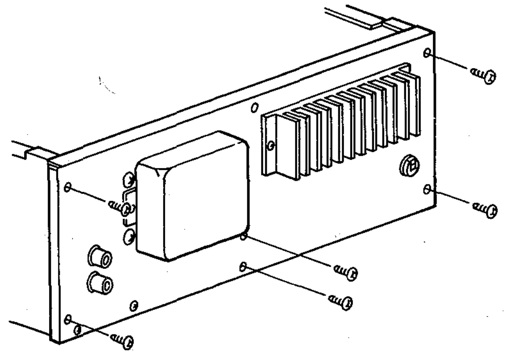
(See P19 and 20)



Remove 7 screws of Metal Mount Bridge and remove it.

REAR PANEL REMOVAL

(See P19 and 20)



Remove 6 screws and remove the Rear Panel.

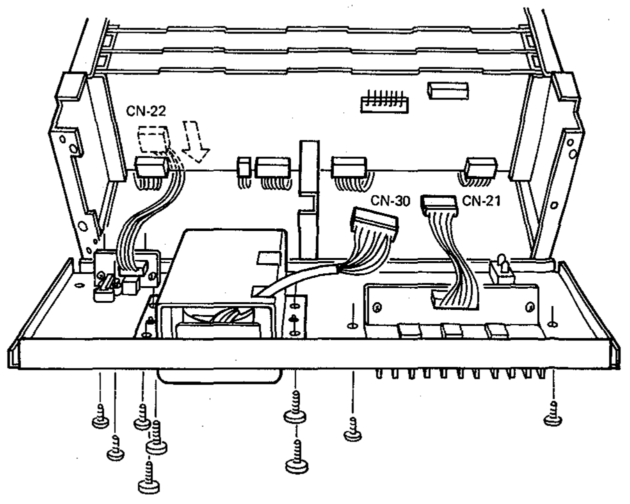
POWER TRANS AND P.C.BOARD REMOVAL

(See P19 and 20)

Remove 4 screws of Power Trans and unplug the Connector CN-30, then remove it.

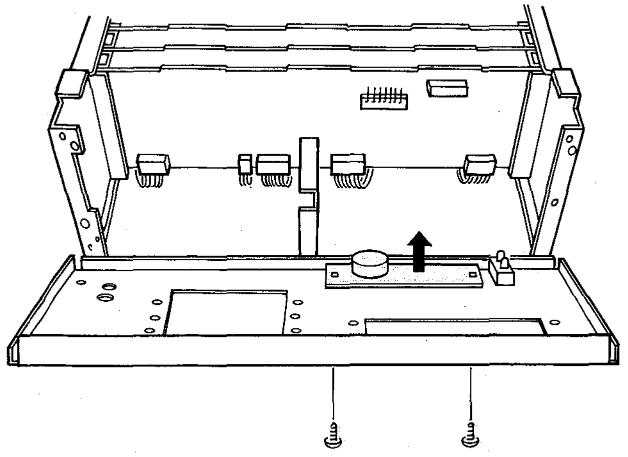
Remove 2 screws of Power Supply P.C.Board and unplug the Connector CN-21, then remove the board.

Remove 3 screws of Output P.C.Board and unplug the Connector CN-22, then remove the board.



FILTER P.C.BOARD REMOVAL

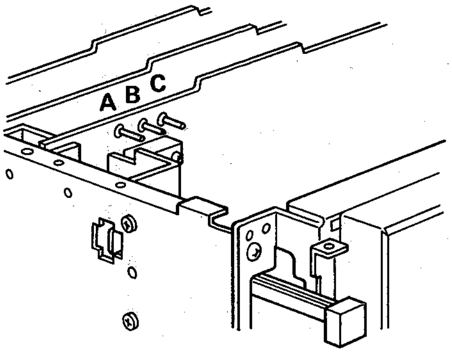
(See P19 and 20)



Remove 2 screws of Filter P.C.Board and remove the board.

MOVE THE PICKUP

(See P19 and 20)



When the unit is disassembled for the purpose of the pickup replacement, first remove the metal bridge and exercise the following steps.

1. Supply power to the unit and keep the lid open to take out the pickup.
2. Short Terminals B and C as illustrated, keeping the pickup away from the motor shaft plate and shift the pickup outwards to take it out of the unit.

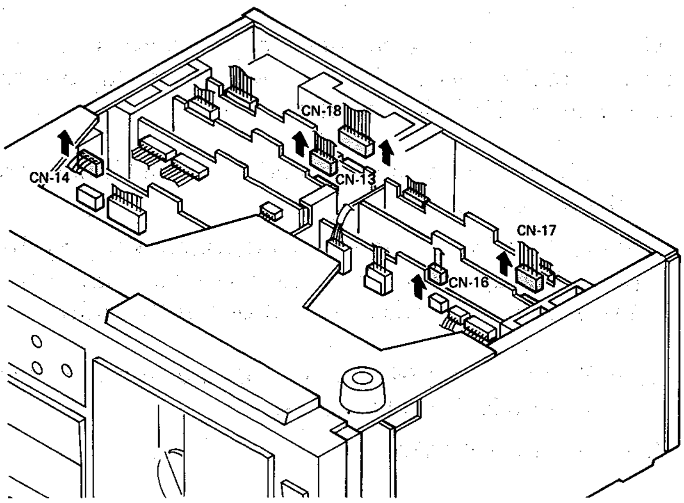
Note: When Terminals A and B are shorted, the pickup is shifted inwards.

3. Turn off the power.

CAUTION: As power is supplied with the cover open following the above procedure, check for loose metal objects inside the unit.

CONTROL PANEL REMOVAL

(See P19 and 20)

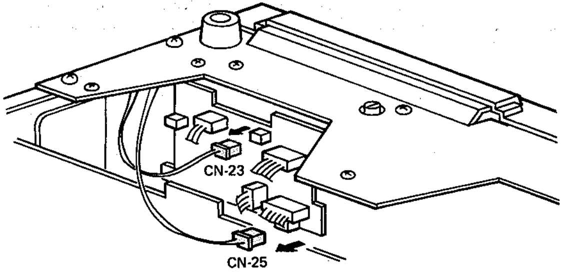


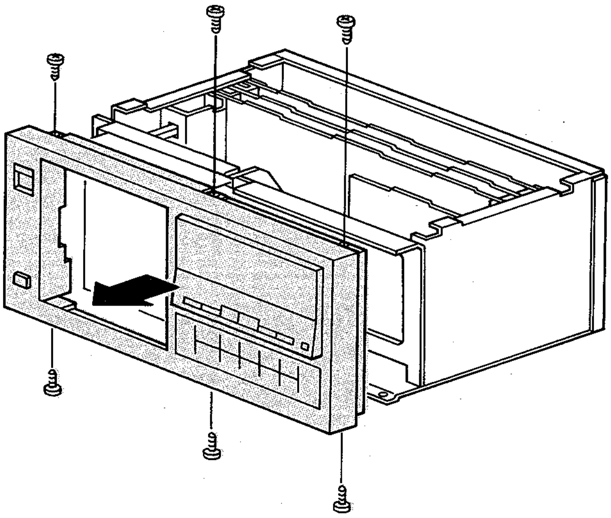
Unplug the Connectors CN-13, CN-14, CN-16, CN-17, CN-18.

NOTE: When the control panel is removed for the laser power adjustment (See page 35.), keep the connectors connected to the P.C.Board.

Unplug the Connectors CN-23, CN-25.

NOTE: When the control panel is removed for the laser power adjustment (See page 35.), keep CN-23 attached to the P.C.Board.

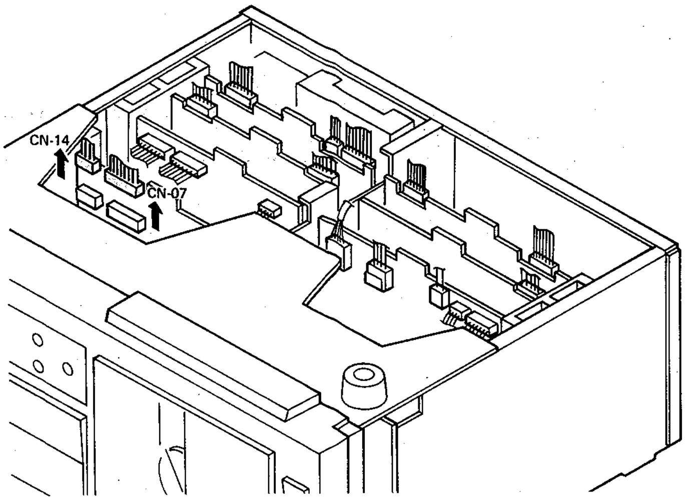




Remove 6 screws of Control Panel, pull the Control Panel off.

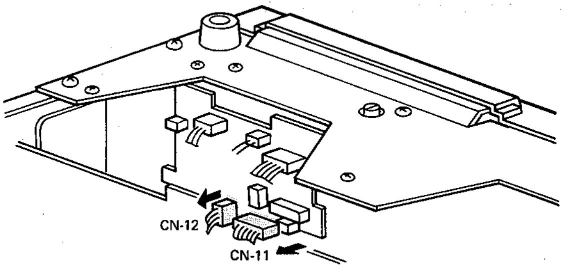
OPEN/CLOSE P.C.BOARD REMOVAL

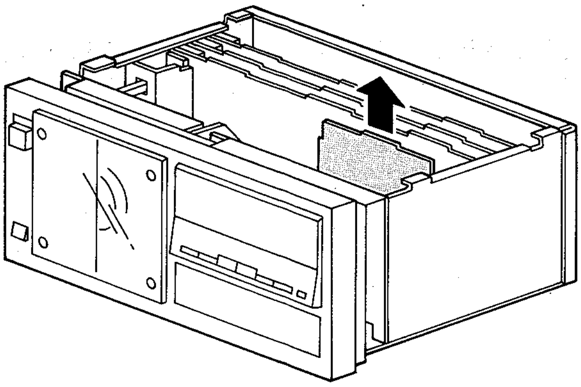
(See P19 and 20)



Unplug the Connector CN-07, CN-14.

Unplug the Connector CN-11 and CN-12.

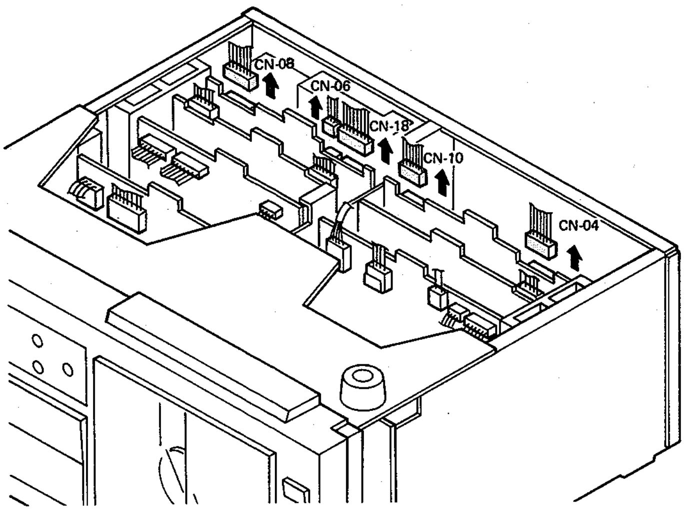




Lift the Open/Close P.C.Board, out.

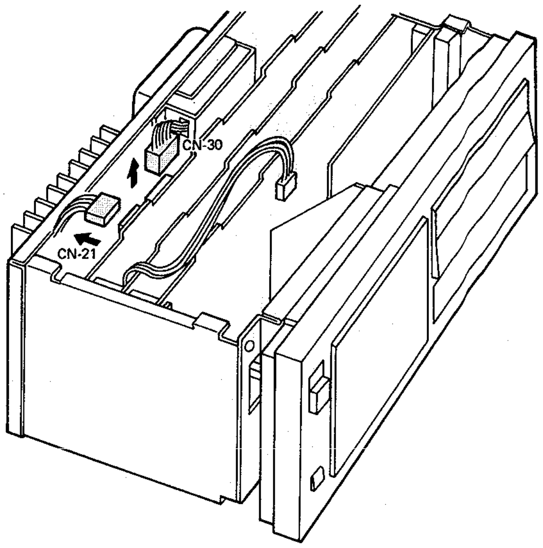
POWER SUPPLY & INTERFACE P.C.BOARD REMOVAL

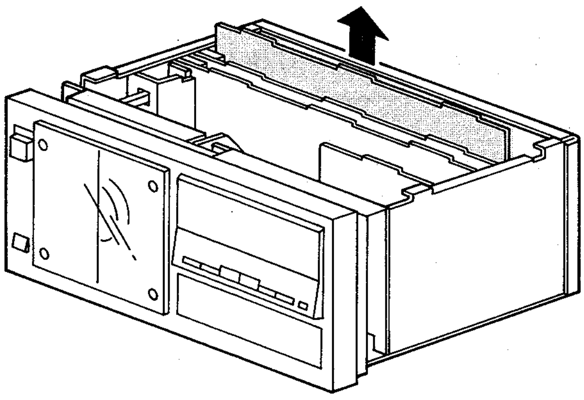
(See P19 and 20)


CN-08
CN-06
CN-18
CN-10
CN-04

Unplug the Connectors CN-04, CN-06, CN-08, CN-10 and CN-18.

Unplug the Connector CN-21 and CN-30.

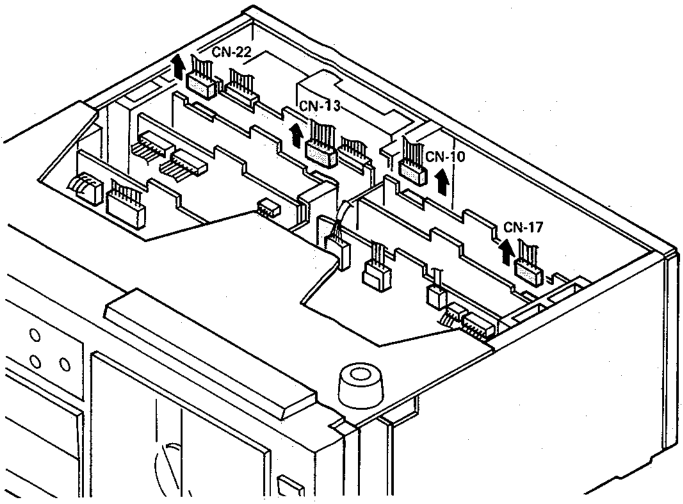




Lift the Power Supply & Interface P.C.Board out.

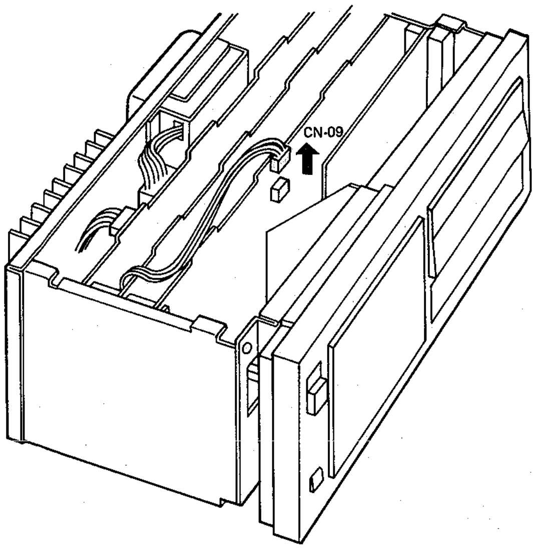
DECODER P.C.BOARD REMOVAL

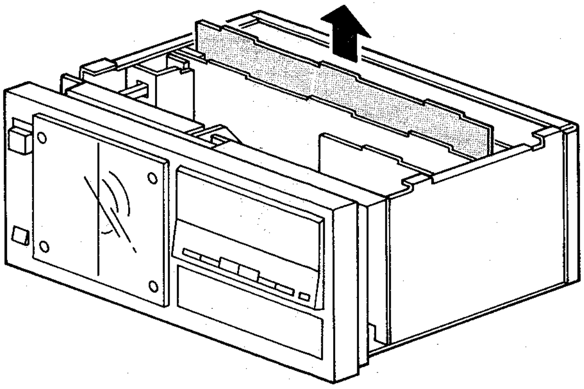
(See P19 and 20)


CN-22
CN-13
CN-10
CN-17

Unplug the Connector CN-10, CN-13, CN-17 and CN-22.

Unplug the Connector CN-09.

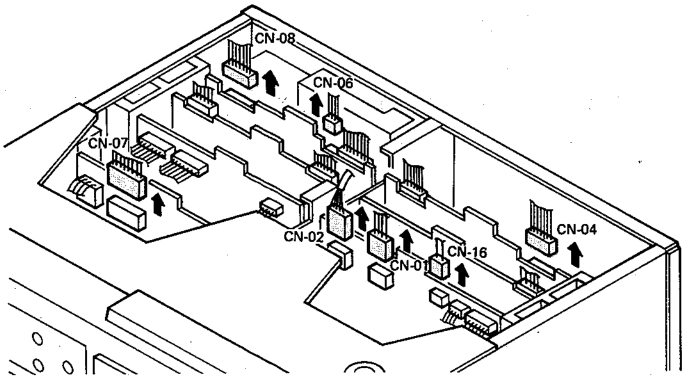




Lift the Decoder P.C.Board out.

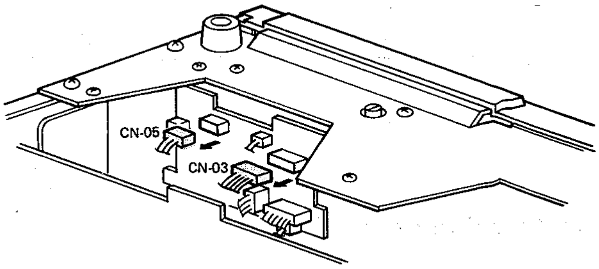
SERVO P.C.BOARD REMOVAL

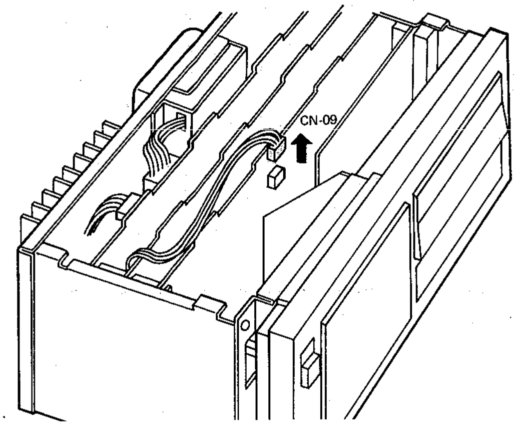
(See P19 and 20)


CN-08
CN-06
CN-07
CN-02
CN-01
CN-16
CN-04

Unplug the Connector CN-01, CN-02, CN-04, CN-06, CN-07, CN-08, CN-16.

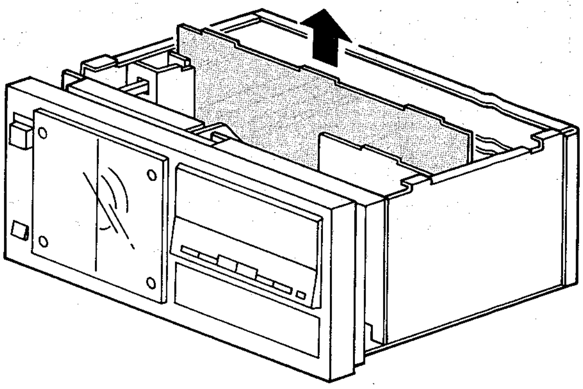
Unplug the Connector CN-03 and CN-05.





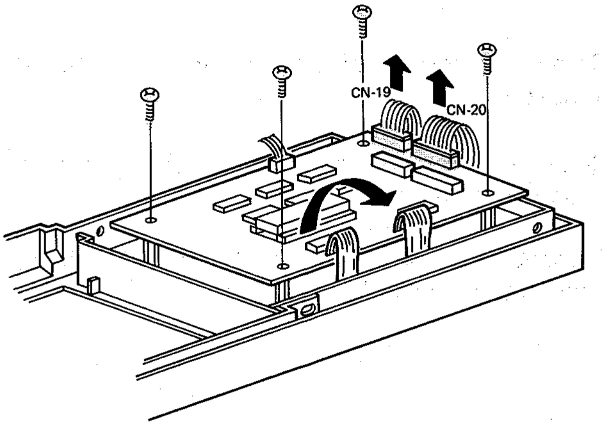
Unplug the Connector CN-09.

Lift the Servo P.C.Board out.



DISPLAY MICOM P.C.BOARD REMOVAL

(See P19 and 20)

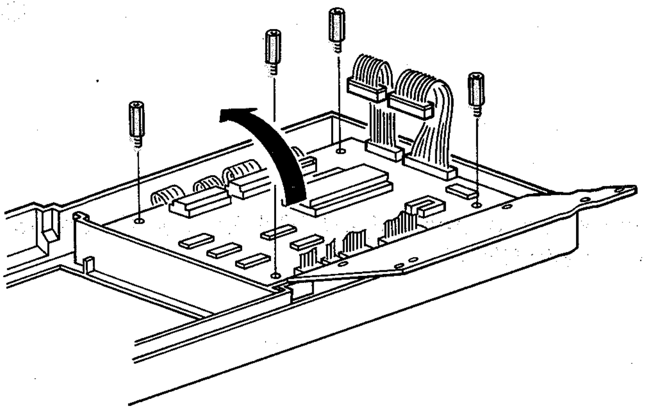


Remove 4 screws of Display Micom P.C.Board and unplug Connector CN-19, CN29 then remove P.C.Board.

PROGRAM MICOM P.C.BOARD REMOVAL

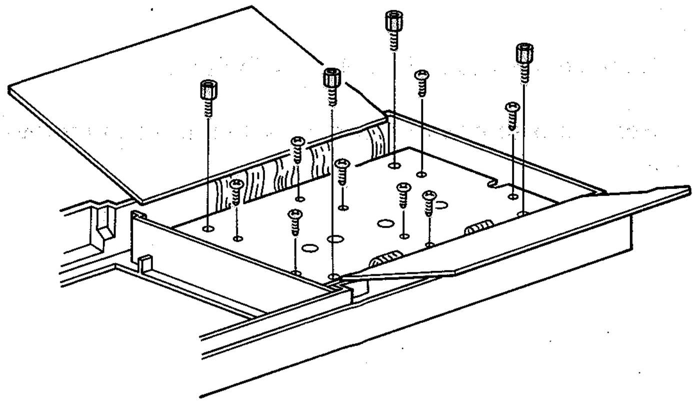
(See P19 and 20)

Remove 4 hexagonal shafts of Program Micom P.C.Board and remove the board.



KEYBOARD SWITCH P.C.BOARD REMOVAL

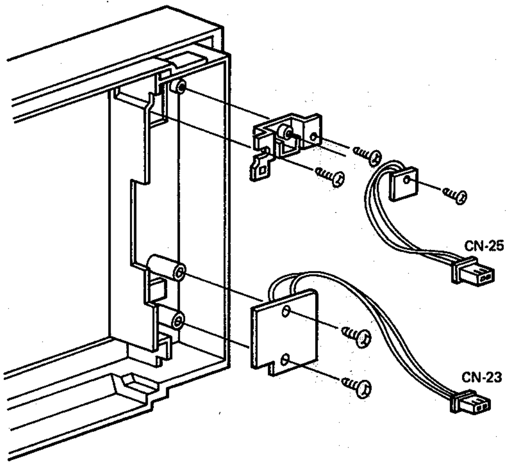
(See P19 and 20)



Remove 4 hexagonal shafts and 8 screws of Keyboard Switch P.C.Board and remove the board.

PUSH SWITCH AND POWER INDICATOR P.C.BOARD REMOVAL

(See P19 and 20)



Remove 2 screws of Power Indicator Shelter and remove it.

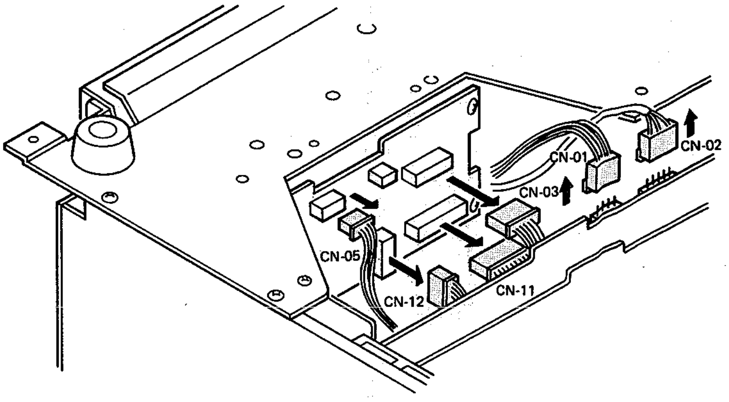
Remove 2 screws of Push Switch P.C.Board and remove the board.

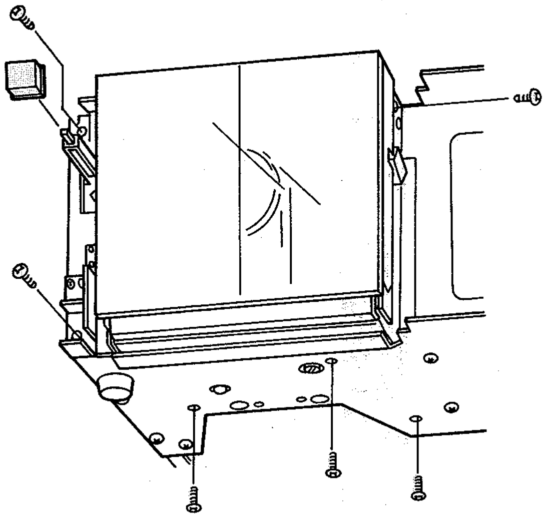
Remove 1 screw of Power Indicator P.C.Board and remove the board.

MECHANICAL SECTION REMOVAL

(See P19 and 20)

Unplug Connectors CN-01, CN-02, CN-03, CN-05, CN-11 and CN-12.



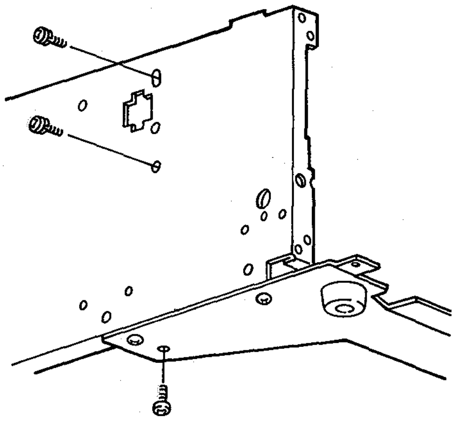


Remove the knob of the Power Switch.

Remove 6 screws of Mechanical Section and remove it.

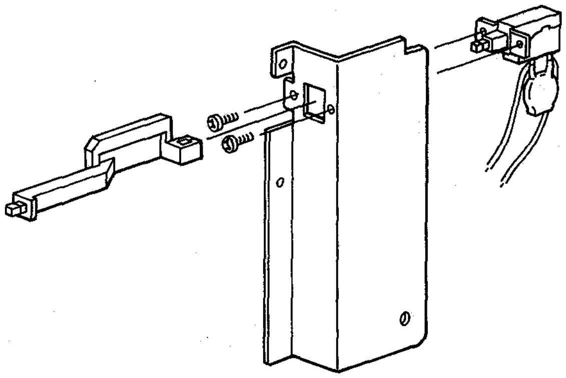
POWER SWITCH REMOVAL

(See P19 and 20)



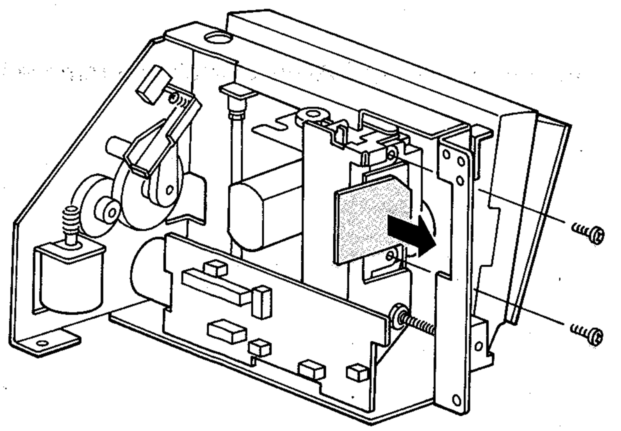
Remove 3 screws of Angle Switch and remove it.

Remove 2 screws of Power Switch and remove it.



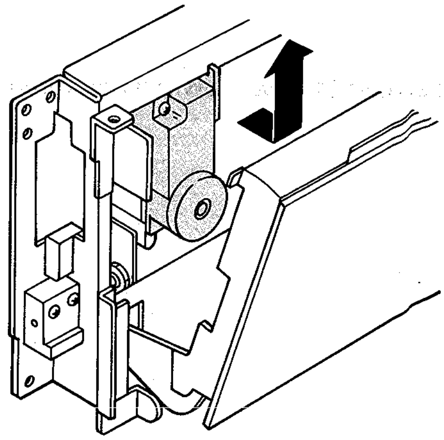
PICKUP REMOVAL

(See P19 and 20)



Unsolder the Pickup P.C.Board Assembly soldered to the pickup. If it is difficult to remove the solder on the Pickup P.C.Board, then first unsolder the connectors CN-01 and CN-02 of the Pickup P.C.Board Assembly and then remove the pickup.

Remove the Pickup from the opening of the lid.



CAUTION:	When the pickup is carried by hand, pay due caution not to damage it with static electricity. Refer to "USE EXTREME CAUTION WHEN HANDLING PICKUP" on page 11. Also, solder the terminals with an antistatic soldering iron.

ADJUSTMENT PROCEDURES

No.	Items	Adjustment
1	Laser Power Adjustment	Adjust the power to the specified magnitude.
2	Disc Loading Mechanism Adjustment	Adjust the timing of the mechanism, so that the disc is stably loaded.
3	Disc Loading Adjustment	Electrically adjust the timing, so that the disc is stably loaded.
4	PLL Clock Adjustment	Set the free-run frequency of PLL to about 4.31 MHz.
5	Focus DC Offset Adjustment	Adjust the DC off-setting of Focus Servo Circuit to "0" (zero).
6	Tracking DC Offset Adjustment	Adjust the DC off-setting of Tracking Servo Circuit to "0" (zero).
7	HF Level Adjustment	Adjust the HF level to 3.2 Vp-p.
8	Pickup Posture Adjustment	Adjust for current posture.
9	Tracking Error Symmetry Adjustment	Adjust the upper and lower forms of the tracking error wave, so that they become symmetrical to the DC 0 V line.
10	Focus DC Balance Adjustment	Obtain current forcusing and optimum wave form of HF.
11	Pickup Starting Position Adjustment	Set the pre-setting position of the pickup to the lead-in area.
12	Lens Shift Range Adjustment	Adjust the lens shift range, so that the lens shifts four tracks inwards and three tracks outwards at a time.
13	Pickup Motor Shifting Speed Adjustment	Adjust the shifting speed of the pickup to the optimum value in accordance with the MICOM program.
14	Focus and Tracking Servo Gain Adjustment	Adjust the gains of the focus servo and the tracking servo to the specified values.
15	Right and Left Channel Balance Adjustment	Adjust the gain difference between the right and left channels to "0" (zero).

Adjustments required after the pickup replacement

- Preform the adjustments as described in Nos. 1, 5, 6, 7, 8, 9, 10, 11, 12, 14, and 15. If necessary, perform the other adjustments.

Before performing the adjustments (Nos. 7, 9, 10, and 14) related to the focus servo and the tracking servo, exercise the focus DC offset adjustment (No. 5) and the tracking DC offset adjustment (No. 6).

The volume used in Nos. 5 and 6 adjustments is located at a place where it can be easily touched and moved by hand. Therefore, the careful handling of it is required especially when the Servo P.C.Board is pulled up and each adjustment is performed. The confirmation of the focus DC and tracking DC off-settings is also required after each adjustment has been completed and the P.C.Board has been set to its original position.

Each adjustment as listed in the chart is separately (without relativity each other) performed. However, the tracking servo gain adjustment must be performed after the tracking error symmetry adjustment (No. 9).

TEST EQUIPMENT REQUIRED

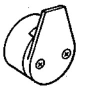
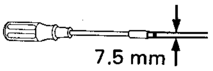
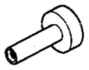
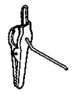
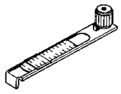
LIST OF TOOLS

No.	Name	Remarks
1	Hexagonal wrench (2 mm)	Used to remove the lid for the disc loading mechanism adjustment
2	Hexagonal wrench (2.5 mm)	Used to turn the screw on the arm assembly for the disc loading mechanism adjustment
3	Box screwdriver (5.5 mm)	Used for the pickup starting position adjustment
4	Plastic minus screwdriver	Used to turn the coil for the PLL clock adjustment
5	Plus screwdriver	
6	Minus screwdriver	

LIST OF TEST DISCS

No.	Name	Manufacturer
1	YEDS4	SONY
2	TEST SAMPLE 3	PHILLIPS

LIST OF JIGS

No.	Shape	Remarks
1		Attachment used for the laser power adjustment
2	 5 mm box screwdriver External size: 7.5 mm	Used to remove the disc housing for the disc loading mechanism adjustment
3	5.5 mm box screwdriver 	Used to turn the screw for the pickup posture adjustment
4		Used as a pointer for the pickup motor shifting speed adjustment
5	Ruler 	Used to measure the shifting for the pickup motor shifting speed adjustment

LIST OF MEASURING INSTRUMENTS

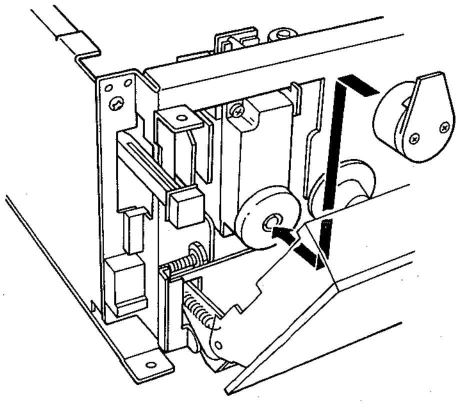
No.	Name	Remarks
1	Beam Power Meter	ML 96A (ANRITS)
2	Frequency Counter	Measuring frequency: more than 5 MHz
3	AC VTVM	The digital multimeter can be used as a substitute.
4	DC VTVM	
5	"Center Zero" Analog DC Meter	If available, easier measurement will be obtained.
6	Synchroscope	Dual-trace type More than 50 MHz

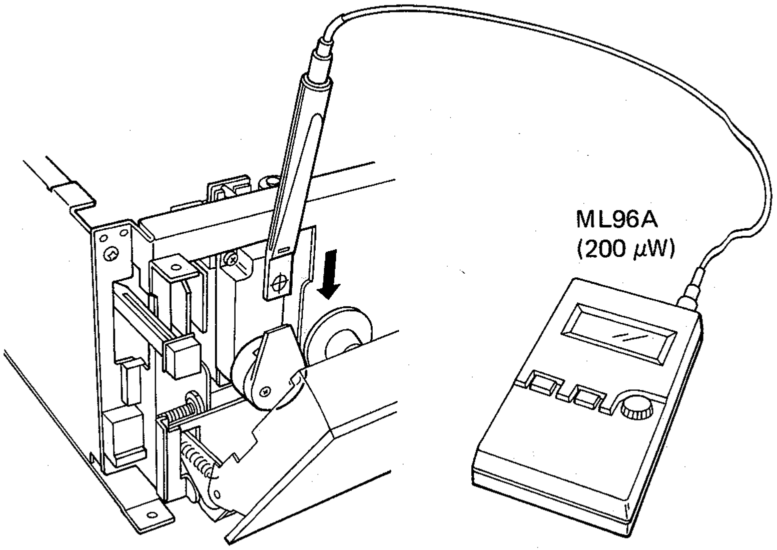
1. Laser Power Adjustment

1-1 Remove the control panel. (See "Control Panel Removal" on page 24.)

1-2 Turn on the power switch and open the lid. Then, move the pickup outwards, so that the attachment can be easily attached. (See "MOVE THE PICKUP" on page 23.)

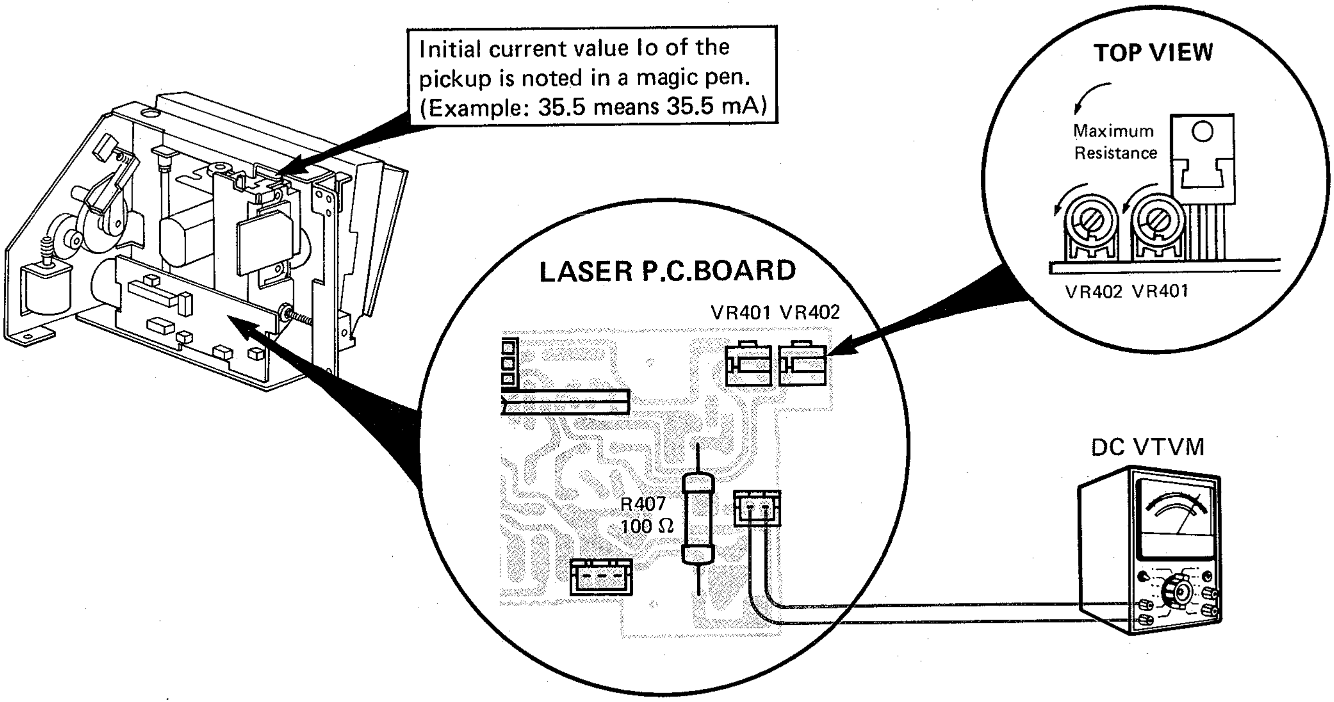
1-3 Mount the attachment on the laser emitting area of the pickup and set the beam power meter (ANRITSU ML96A) of it.




ML96A
(200 μW)

1-4 Adjust VR401 and VR402 to the position of maximum resistance (Laser P.C.Board).

1-5 Connect a DC VTVM for current measurement.
Note: Use the 2P connector for terminal voltage check (Emitter Resistance: 100 ohms).


Initial current value Io of the pickup is noted in a magic pen. (Example: 35.5 means 35.5 mA)
TOP VIEW
Maximum Resistance
VR402 VR401
LASER P.C.BOARD
VR401 VR402
R407
100 Ω
DC VTVM

1-6 Turn on the Laser SW and the Close SW mounted beside the mechanism (See page 9) and press the OPEN/CLOSE SW. (At this time, the lid does not close because the Close SW is set in "ON" mode.)

1-7 Press the Play button. (Laser radiates.)

1-8 Measure the magnitude of the emitted beam with a beam power meter.

1-9 Set the power to the specified value with VR401 and VR402.
First, adjust VR401 (50K) and then perform the fine adjustment with VR402 (5K). Set the power to 200 μW on the meter.

1-10 At this time, measure the current (I_1) which flows in R407 (100 ohms) with the DC V TVM. IR1 is obtained by the following equation.

$$\text{Normal operating current 1} = \text{Initial current value Io} \times \frac{T_1 + 77}{100}$$

(See the illustration on the previous page.)

Where T_1 is a room temperature at the measurement of I_1 (°C)

$$IR1 = \frac{I_1}{\text{Normal operating current 1}}$$

If IR1 is less than 1.080, the pickup is normal.
If IR1 is 1.081 – 1.300, perform the 100-hour aging test.
If IR1 is more than 1.301, replace the pickup with a new one.

1-11 In case of the 100-hour aging test: Measure the current (I_2) which flows in R407 (100 ohms) after the aging and obtain IR2 by the following equation.

$$\text{Normal operating current 2} = I_1 \times \frac{100 + T_2 - T_1}{100}$$

Where T_2 is a room temperature at the measurement of I_2 (°C)

$$IR2 = \frac{I_2}{\text{Normal operating current 2}}$$

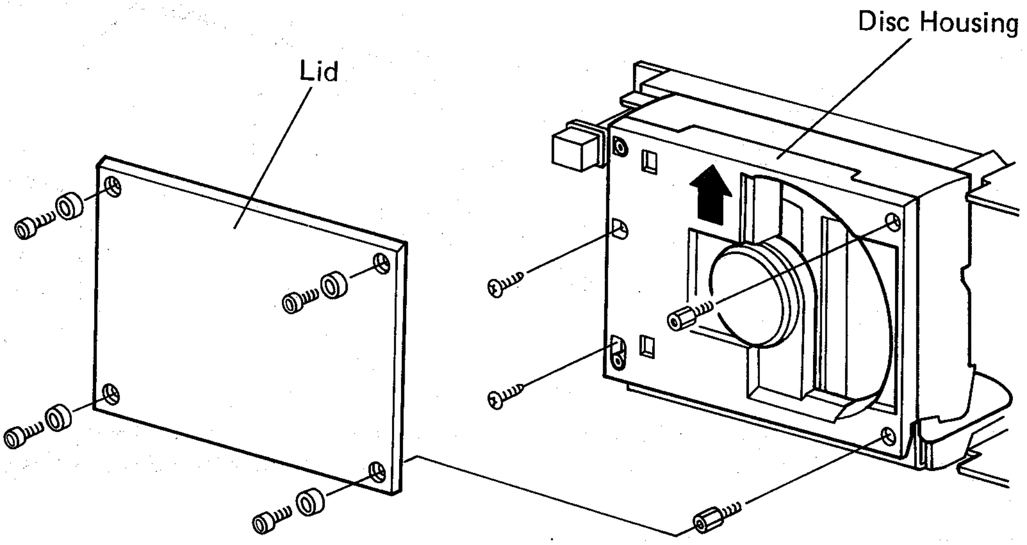
If IR2 is less than 1.050, the pickup is normal.
If IR2 is more than 1.051, replace the pickup with a new one.

Note: Ignore the error in the resistance of R407 (100 ohms).

2. Disc Loading Mechanism Adjustment

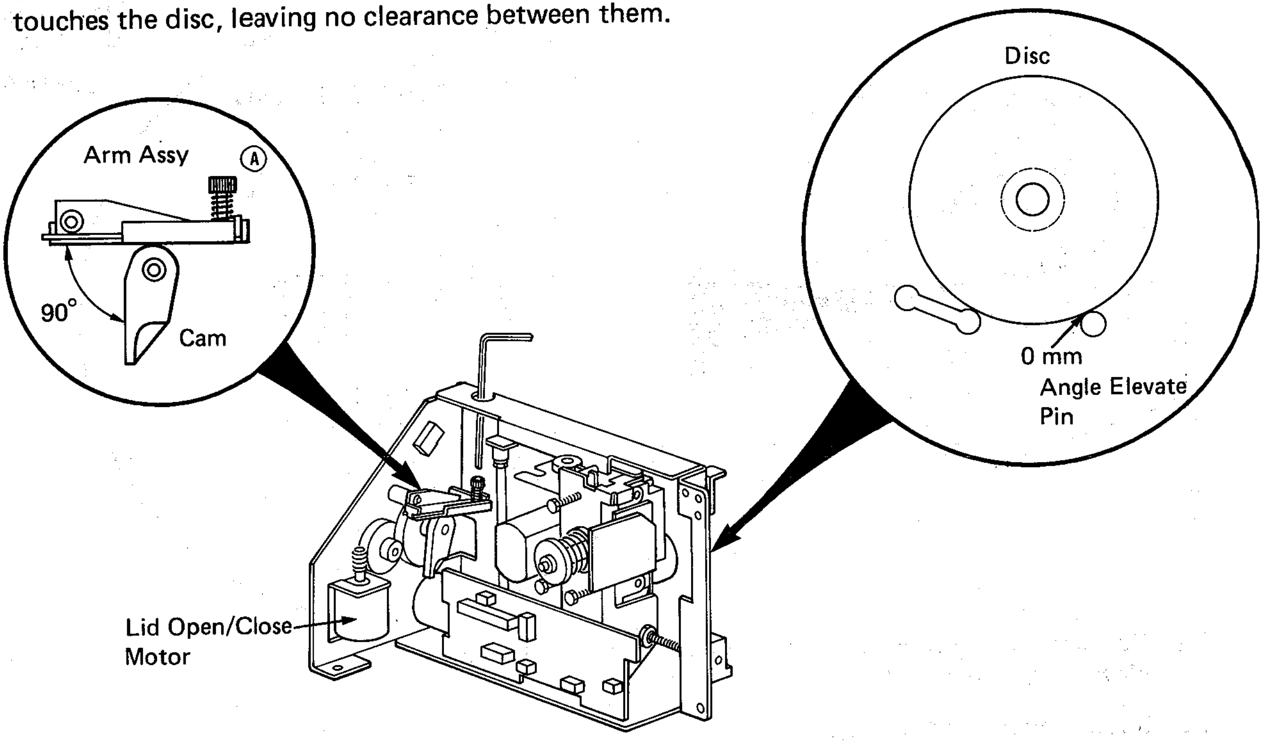
2-1 Remove the control panel. (See "CONTROL PANEL REMOVAL" on page 24.)

2-2 Remove the lid and the disc housing as illustrated.



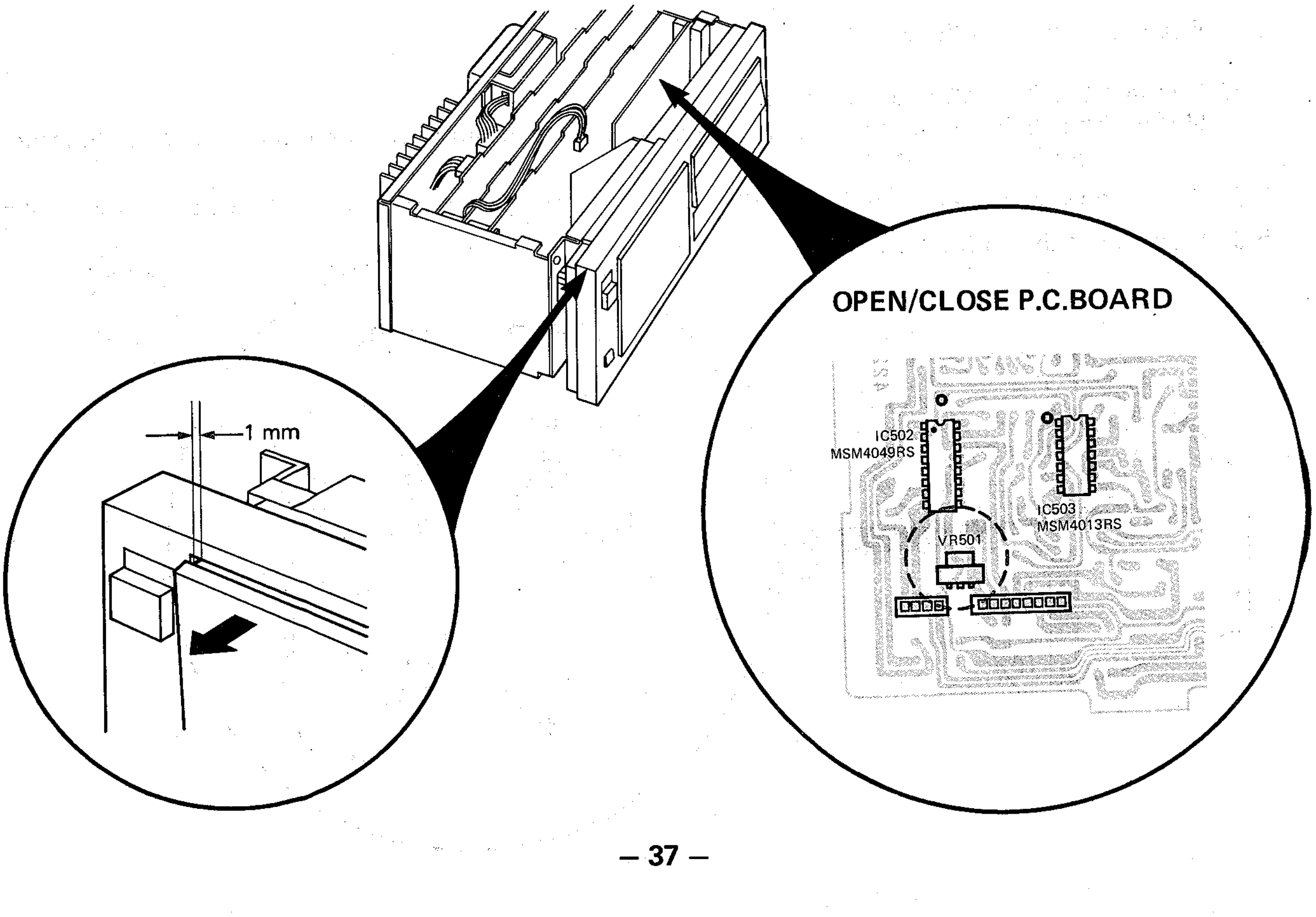
2-3 Hand-rotate the lid open/close motor, so that the cam becomes 90 degrees to the arm assy. (See the illustration below.)

2-4 Set the YEDS4 disc to the spindle motor and adjust Screw A, so that the angle elevate pin touches the disc, leaving no clearance between them.


Arm Assy
Ⓐ
90°
Cam
Disc
0 mm
Angle Elevate Pin
Lid Open/Close Motor

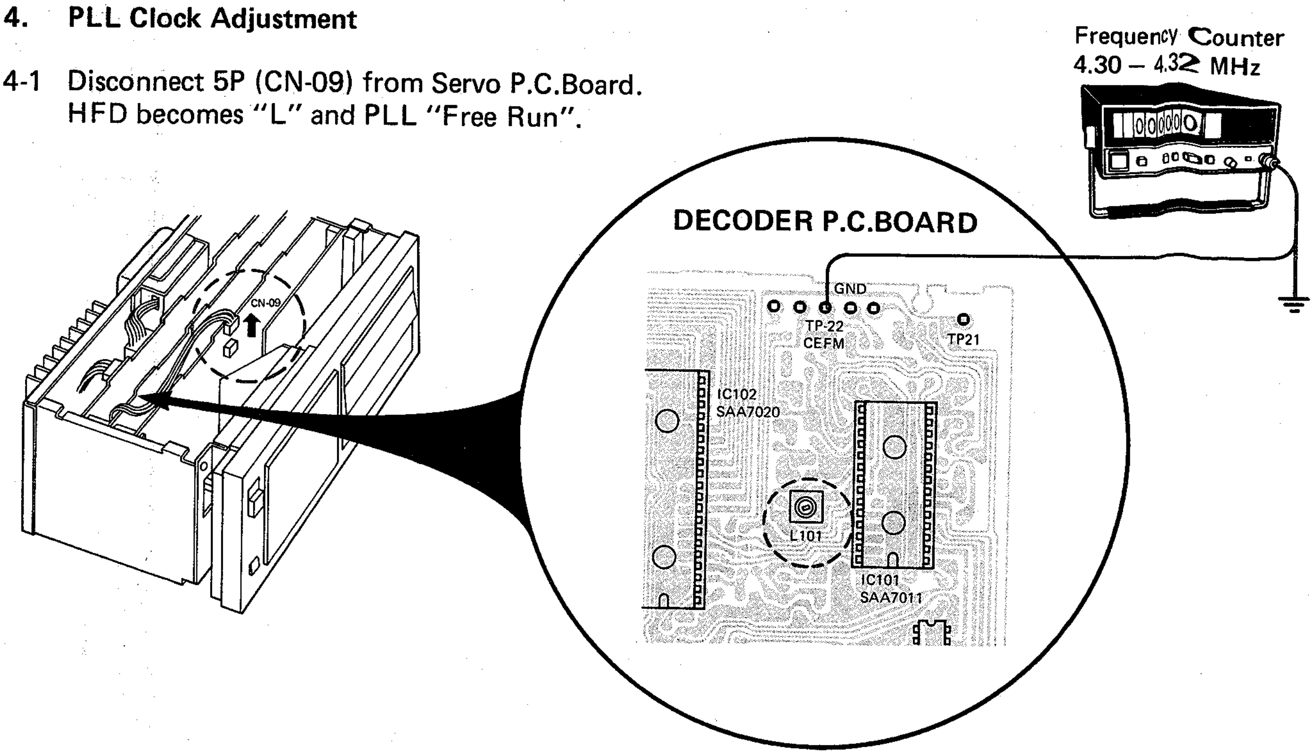
3. Disc Loading Adjustment

Pull the lid towards you with the lid closed and adjust VR501, so that the clearance between the panel and the lid becomes 1 mm. (After turning VR501, open and close the lid and measure the clearance.)


1 mm
OPEN/CLOSE P.C.BOARD
IC502
MSM4049RS
IC503
MSM4013RS
VR501

4. PLL Clock Adjustment

4-1 Disconnect 5P (CN-09) from Servo P.C.Board.
HFD becomes "L" and PLL "Free Run".


Frequency Counter
4.30 – 4.32 MHz
CN-09
DECODER P.C.BOARD
GND
TP-22
CEFM
TP21
IC102
SAA7020
L101
IC101
SAA7011

4-2 Connect the counter to the PLL output (CEFM TP-22).
Note: Use probes of 10:1.

4-3 Supply power to the unit.

4-4 Adjust L101 to a frequency of 4.30 – 4.32 MHz.
Note: Adjust L101 with a plastic screwdriver with the P.C.Board pulled up. Then, re-mount the P.C.Board on the original position and check that the frequency of 4.30 – 4.32 MHz is obtained. If not, repeat this adjustment until the specified value is obtained.

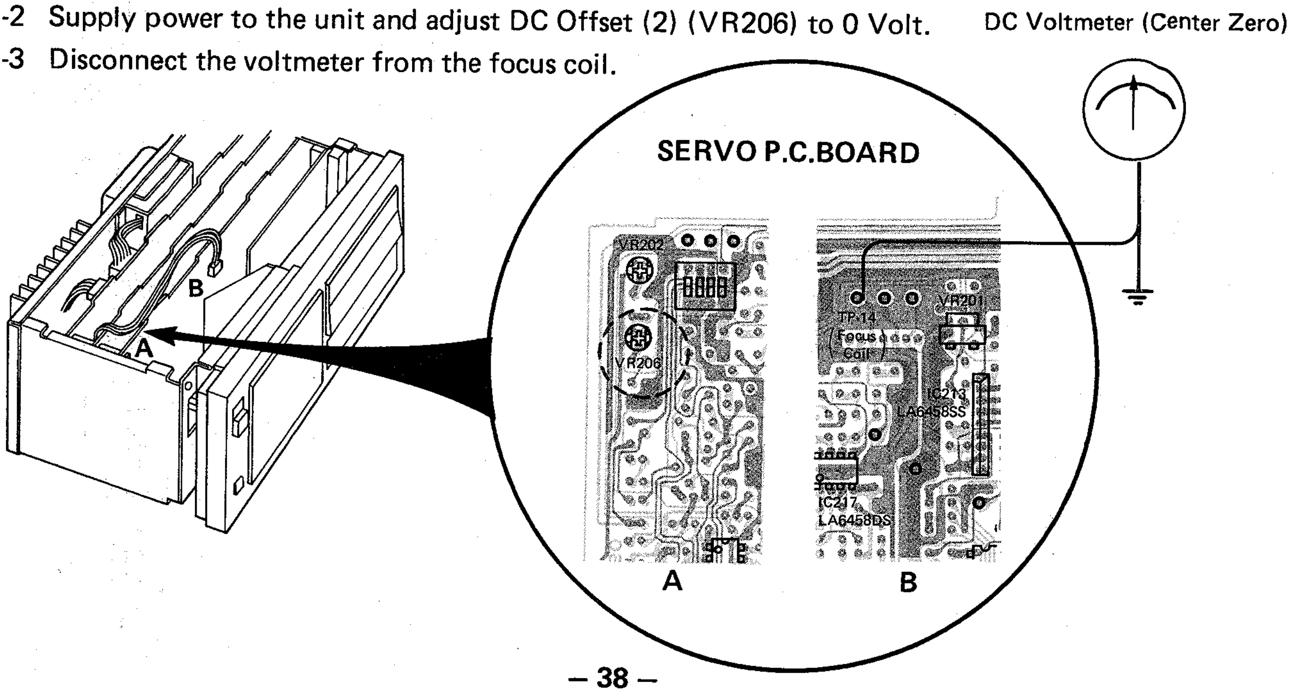
4-5 Disconnect the counter from the PLL output and connect the connector (CN-09) to it.

5. Focus DC Offset Adjustment

5-1 Connect the DC Voltmeter to the focus coil TP-14.
Note: The digital multimeter can be used but better results will be obtained with a "Center Zero" analog meter.

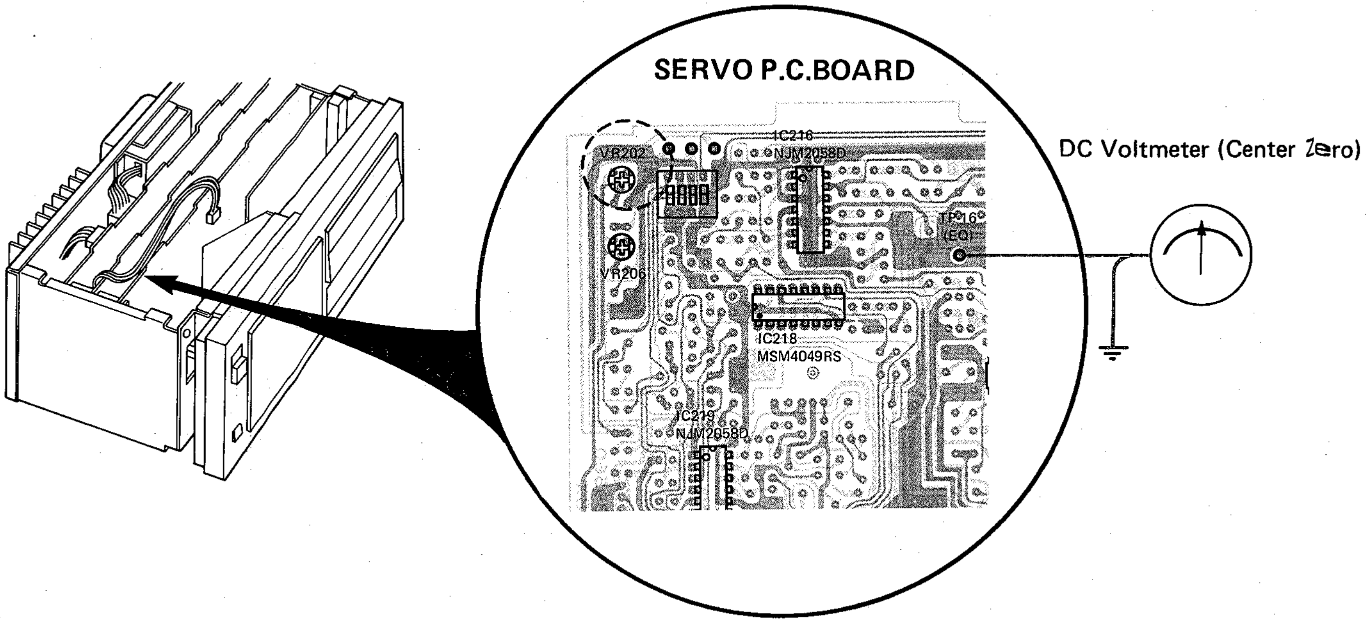
5-2 Supply power to the unit and adjust DC Offset (2) (VR206) to 0 Volt.

5-3 Disconnect the voltmeter from the focus coil.


DC Voltmeter (Center Zero)
SERVO P.C.BOARD
B
A
VR202
VR206
TP-14
Focus
Coil
VR201
IC213
LA6458SS
IC217
LA6458DS
A
B

6. Tracking DC Offset Adjustment

6-1 Connect the DC voltmeter to the EQ output of the feed servo (TP-16).
Note: Same as explained in item 5-1.

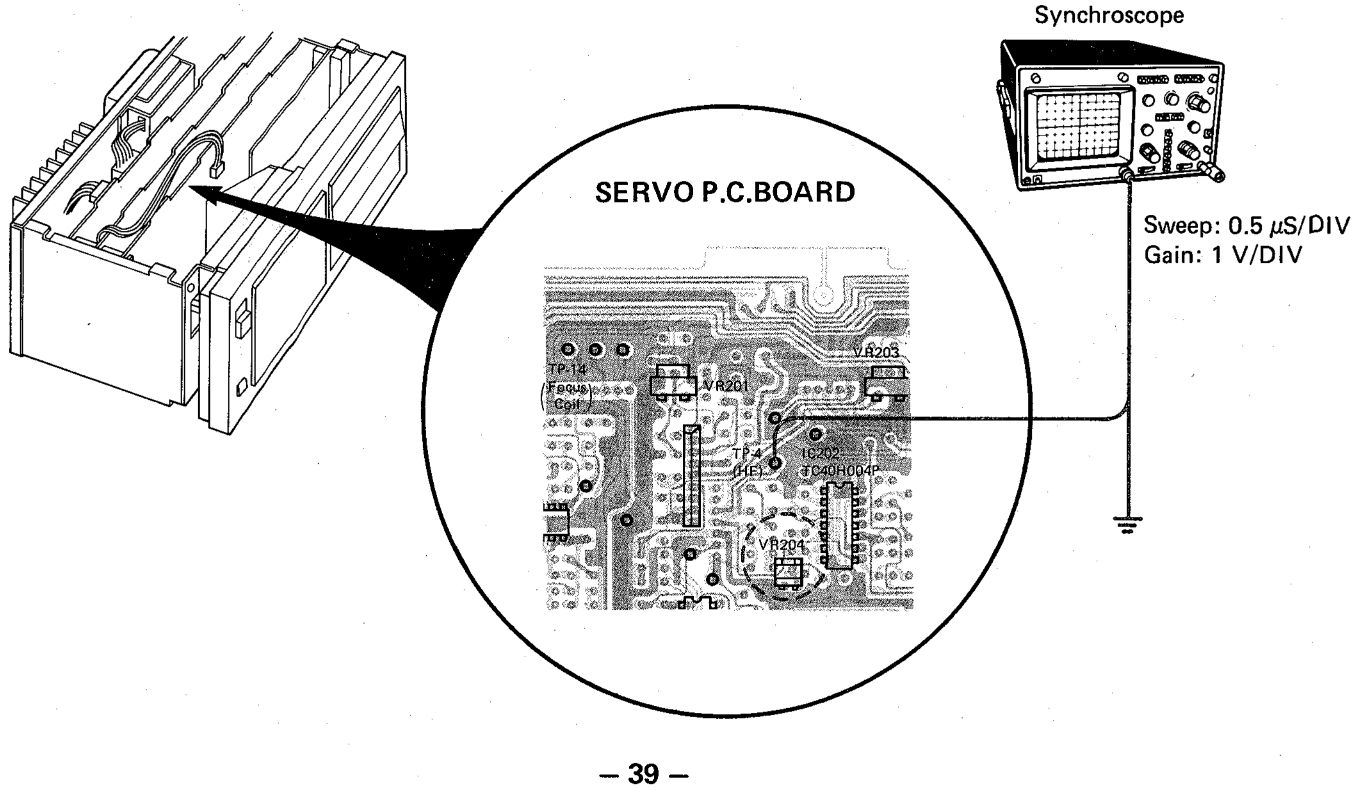

SERVO P.C.BOARD
VR202
IC216
NJM2058D
TP-16
(EQ)
VR206
IC218
MSM4049RS
IC219
NJM2058D
DC Voltmeter (Center Zero)

6-2 Supply power to the unit and adjust DC Offset (VR202) to 0 Volt.

6-3 Disconnect the voltmeter from the EQ output.

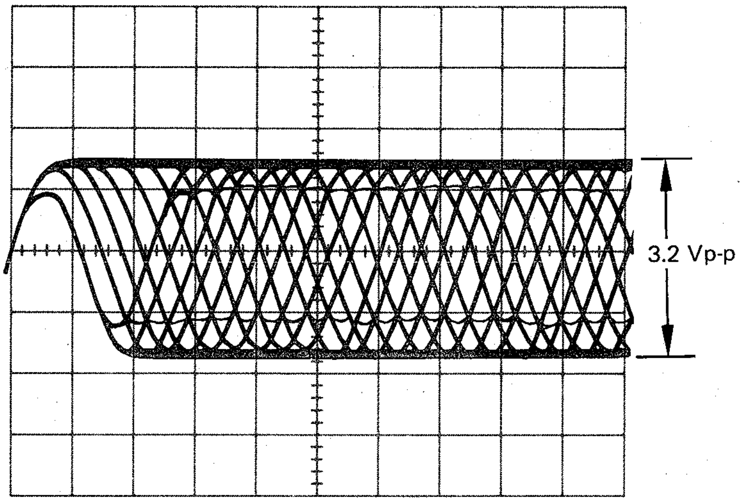
7. HF Level Adjustment

7-1 Connect the synchroscope to HF TP-4. (Sweep: 0.5 μS/DIV, Gain: 1 V/DIV)


Synchroscope
SERVO P.C.BOARD
TP-14
(Focus Coil)
VR201
VR203
TP-4
(HF)
IC202
TC40H004P
VR204
Sweep: 0.5 μS/DIV
Gain: 1 V/DIV

7-2 Supply power to the unit and set YEDS4 disc on the unit. Then, reproduce the first program.

7-3 Adjust VR204, so that the amplitude of the HF wave form becomes 3.2 Vp-p.

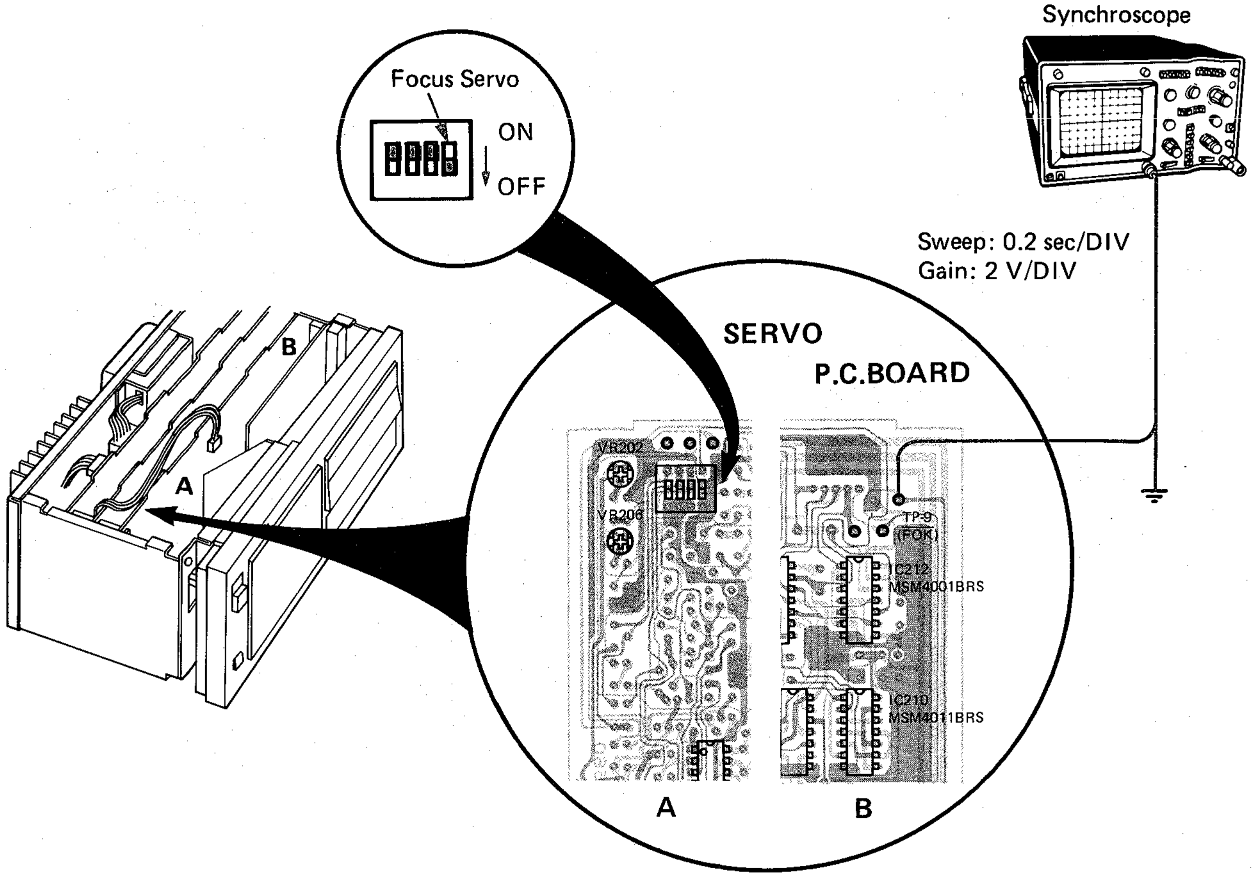


TP-4 Gain: 1 V/DIV Sweep: 0.5 μS/DIV

8. Pickup Posture Adjustment

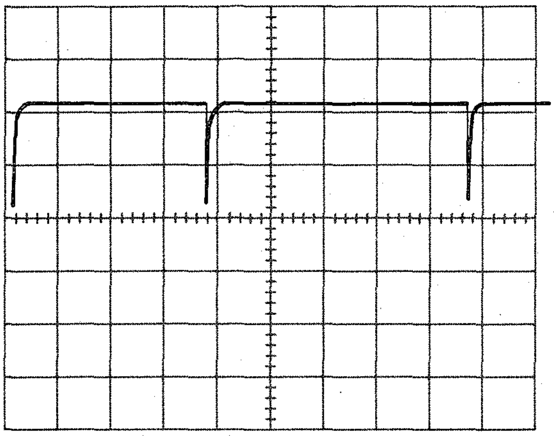
8-1 Load the unit with YEDS4 and change the focus servo to "OFF".

8-2 Connect a synchroscope to the test point of $\overline{\text{FOK}}$ (TP-9).
(Sweep: 0.2 sec./DIV, Gain: 2 V/DIV)

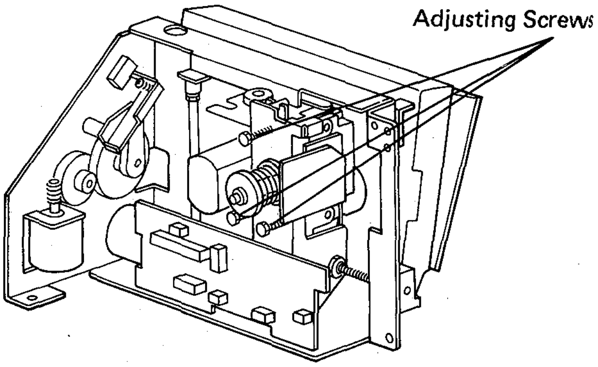

Synchroscope
Focus Servo
ON
OFF
Sweep: 0.2 sec/DIV
Gain: 2 V/DIV
SERVO
P.C.BOARD
B
A
VR202
VR206
TP-9
(FOK)
IC212
MSM4001BRS
IC210
MSM4011BRS
A
B

8-3 Switch power ON and press the start key to rotate the disc.

8-4 Adjust the pickup height so that $\overline{\text{FOK}}$ pulses are generated at approximately the same intervals. (Adjust the pickup height with the three adjustment screws, observing that the pickup is parallel to the disc.)

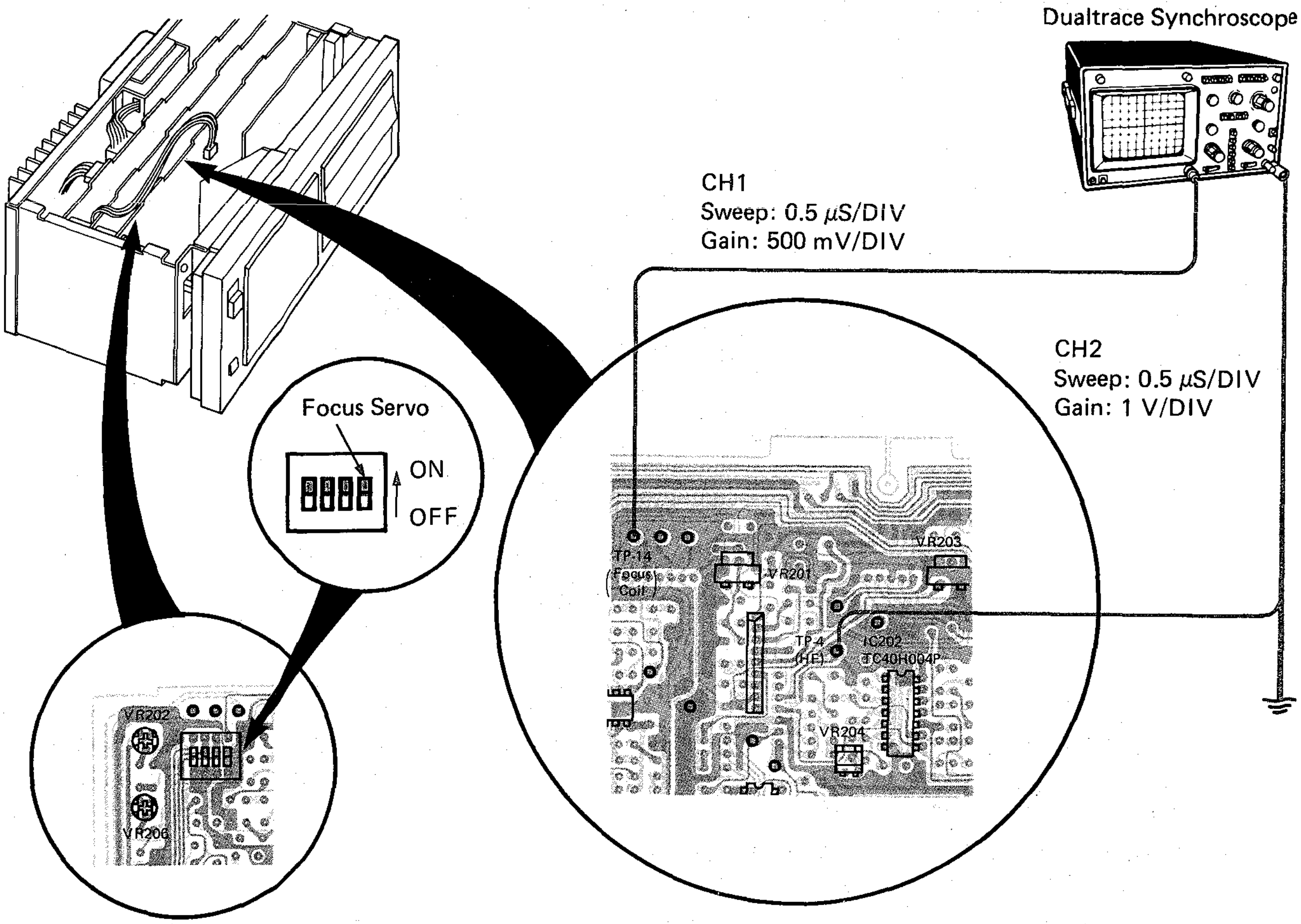


TP-9 Sweep: 0.2 sec./DIV Gain: 2 V/DIV

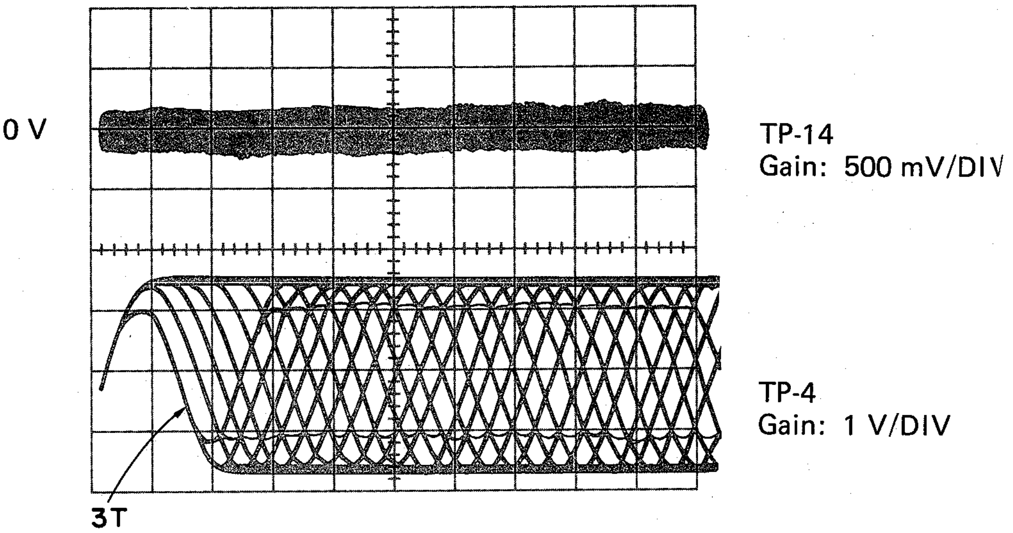

Adjusting Screws

8-5 Use a separate dualtrace synchroscope and set sweep of 0.5 μs
Connect Focus Coil TP-14 (500 mV/DIV) to CH1 and HF TP-4 (1 V/DIV) to CH2.

8-6 Turn on the focus servo to activate the focusing.

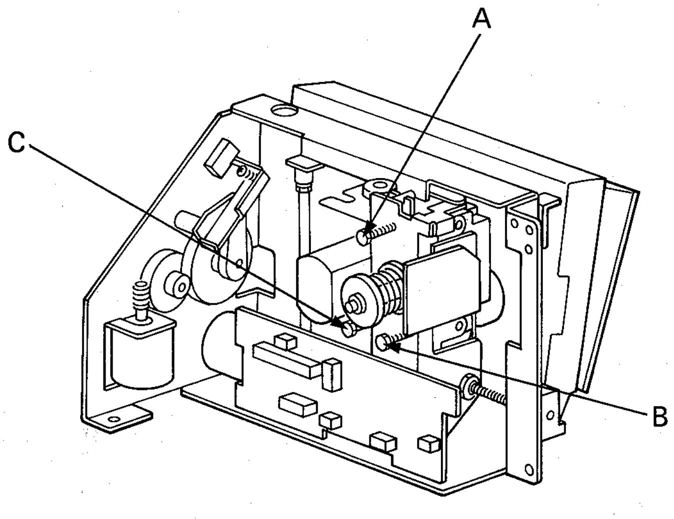

Dualtrace Synchroscope
CH1
Sweep: 0.5 μS/DIV
Gain: 500 mV/DIV
CH2
Sweep: 0.5 μS/DIV
Gain: 1 V/DIV
Focus Servo
ON
OFF
TP-14 (Focus Coil)
VR201
VR203
TP-4 (HF)
IC202 TC40H004P
VR204
VR202
VR206

8-7 Adjust the pickup height, to obtain 0 V DC across focus coil TP-14.
See the illustration below.



Sweep: 0.5 μS/DIV

8-8 Observe the pattern of HF and adjust the pickup slant, paying attention to the crest of 3T. Perform the adjustment by turning the screws A and C.



8-9 The DC Component contained in the signal at TP-14 changes from 0 (zero) to ΔX V according to the pickup height. Reduce the DC component only by half of ΔX V (ΔX/2 V) close to 0 (zero) by turning the screw B.

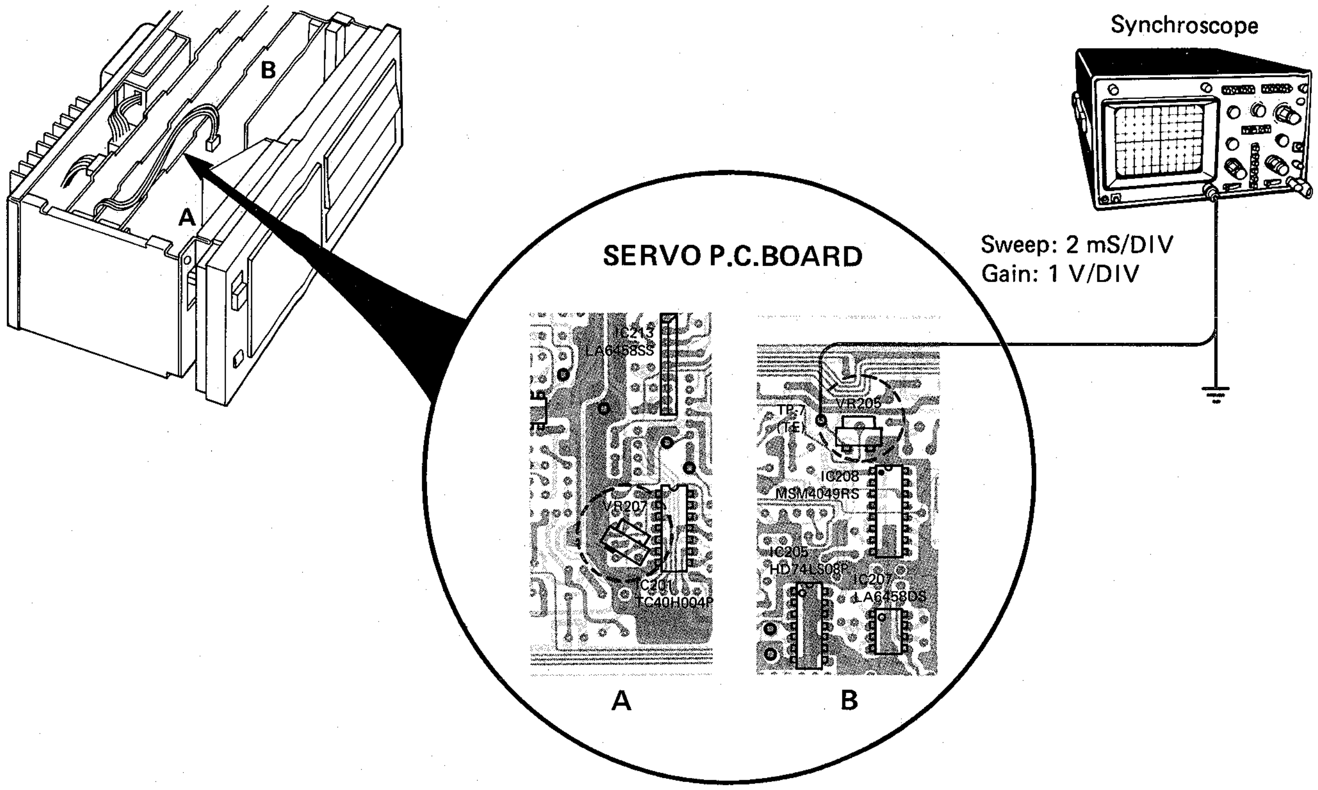
8-10 Observe the pattern of HF again and turn the screws A and C, obtain maximum.
Note: TP-14 becmes 0 (zero) volts.

8-11 Disconnect the synchroscope from the test point and secure the three screws with screw lock.

9. Tracking Error Symmetry Adjustment

9-1 Adjust VR205 (Tracking Servo Gain Volume) to the minimum setting (CCW).

9-2 Connect the synchroscope to TE TP-7. (Sweep: 2 mS/DIV, Gain: 1 V/DIV)


Synchroscope
B
A
SERVO P.C.BOARD
Sweep: 2 mS/DIV
Gain: 1 V/DIV
IC213
LA6458SS
VR207
IC201
TC40H004P
TP-7
(TE)
VR205
IC208
MSM4049RS
IC205
HD74LS08P
IC207
LA6458DS
A
B

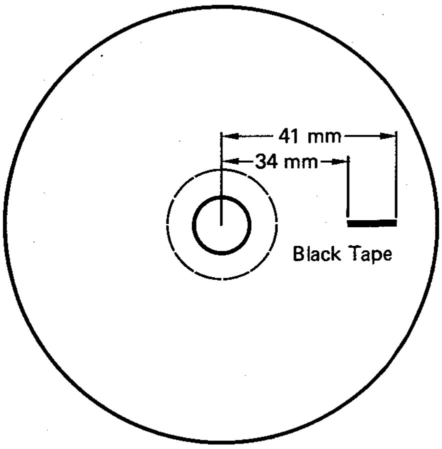
9-3 Load the unit with YEDS4 disc and reproduce the area where the absolute time shows 1:00 – 2:00 on the display of the unit.

9-4 Adjust VR207, so that the upper half of the TE wave form has the same size as the lower half to 0 V DC.

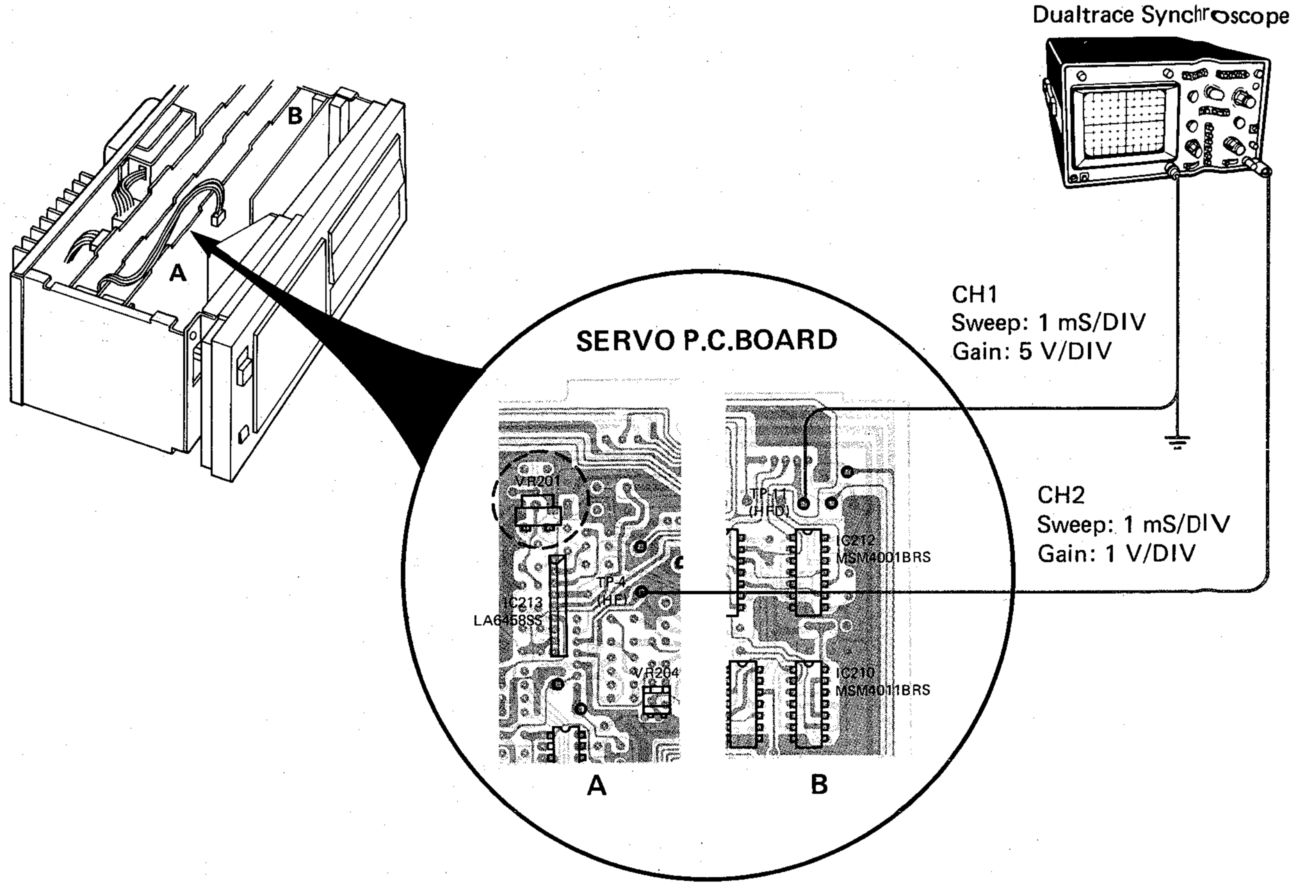
9-5 After this adjustment, be sure to perform the tracking servo gain adjustment.

10. Focus DC Balance Adjustment

10-1 Affix a black tape 7 mm long and 0.8 mm wide to YEDS4 disc at a radius of (34 mm – 41 mm).
(This should produce a dropout of 0.7 msec. on the 4th, 5th, and 6th programs.)

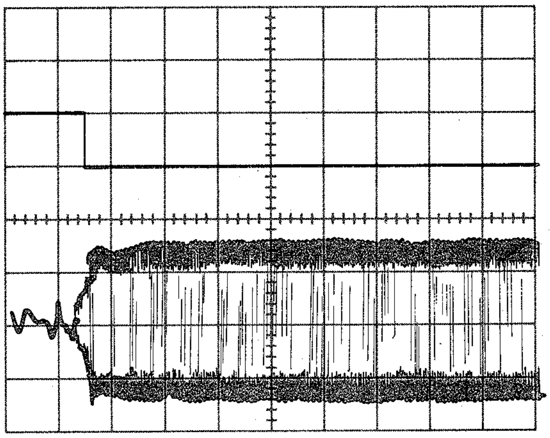

41 mm
34 mm
Black Tape

10-2 Set the dualtrace synchroscope to the sweep speed of 1 mS/DIV.
Set HFD TP-11 (5 V/DIV) on CH1 and HF TP-4 (1 V/DIV) on CH2.
Note: Apply trigger at the increasing point of CH1.


Dualtrace Synchroscope
B
A
SERVO P.C.BOARD
CH1
Sweep: 1 mS/DIV
Gain: 5 V/DIV
CH2
Sweep: 1 mS/DIV
Gain: 1 V/DIV
VR201
IC213
LA6458SS
TP-4
(HF)
VR204
TP-11
(HFD)
IC212
MSM4001BRS
IC210
MSM4011BRS
A
B

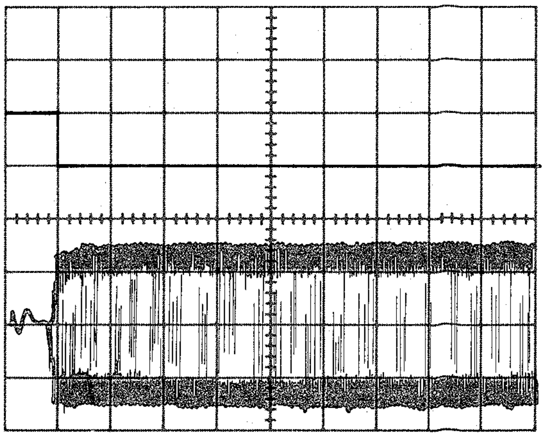
10-3 Load the unit with the above described YEDS4 disc and read in the 5th program.

10-4 Adjust the focus balance (1) (VR201), for minimum dropout duration of HF.
See the illustration below.



Sweep: 1 mS/DIV

Wrong Adjustment



Sweep: 1 mS/DIV

Correct Adjustment

10-5 After the adjustment is completed, disconnect the dualtrace synchroscope from the test point.

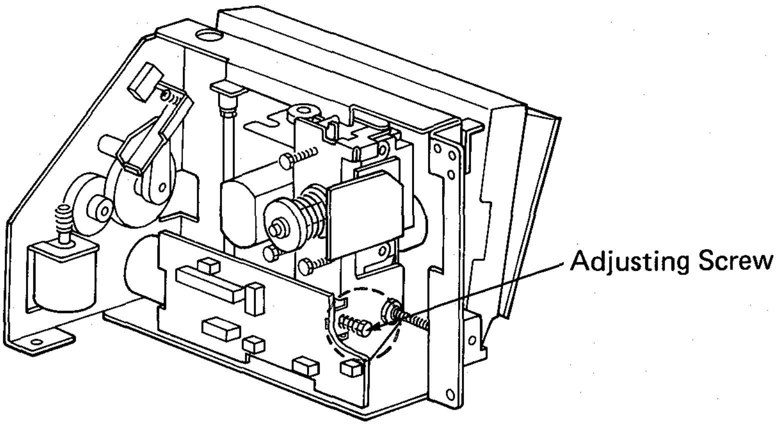
11. Pickup Starting Position Adjustment

11-1 Load the unit with YEDS4 disc and change the display to Track Time.

11-2 Press the stop key and then, the start key.
(The track time of the readin track is displayed.)

11-3 Turn the adjusting screw, so that the track time becomes 1:20. If the track time is less than 1:15, turn the screw CW, and if more than 1:25, turn it CCW.

CAUTION: As the distance between the adjusting screw and the Laser P.C.Board is very close, the screwdriver should not touch the P.C.Board. Otherwise, the short-circuit will result. (Before turning the screw, turn off the power or insulate the screwdriver with an insulating tape.)

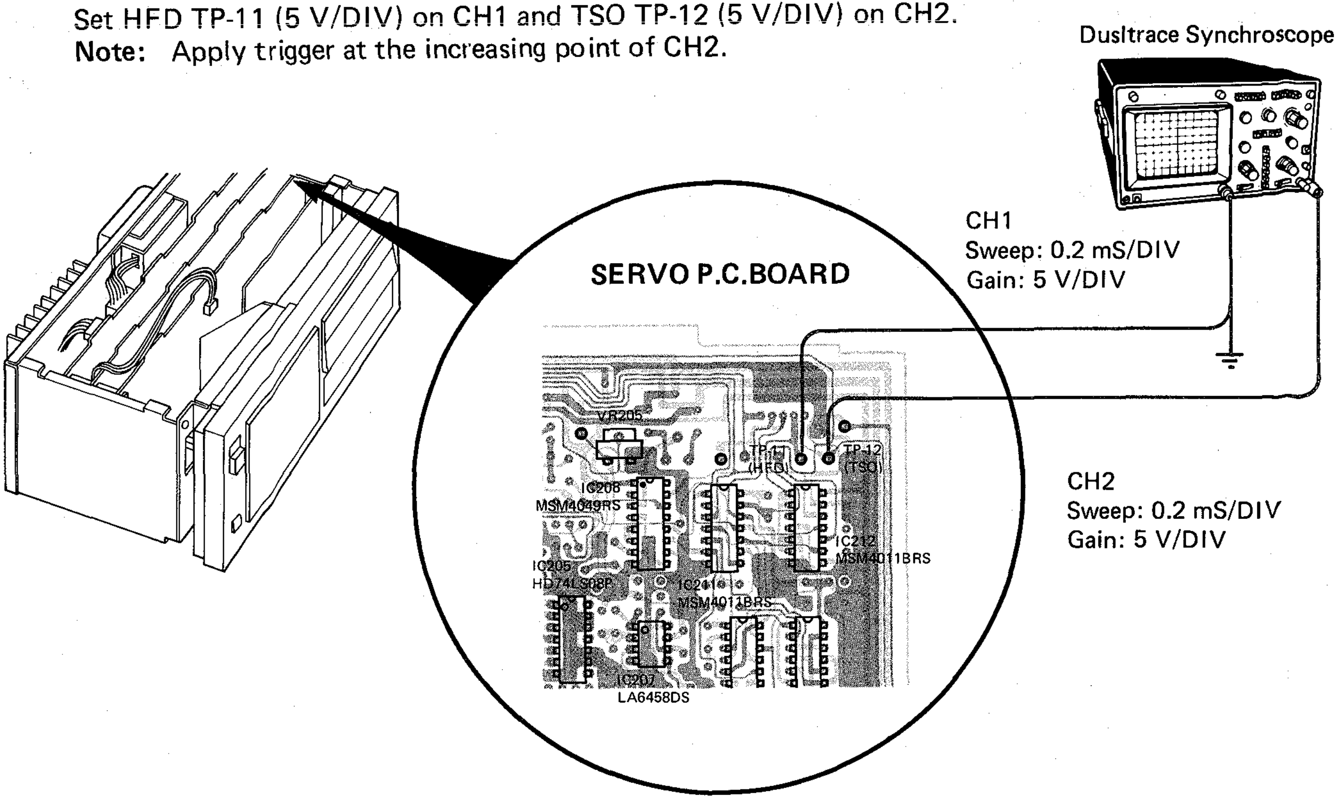

Adjusting Screw

11-4 Repeat the above items 11-2 and 11-3 until the track time becomes 1:15 – 1:25.

11-5 The adjustment is completed.

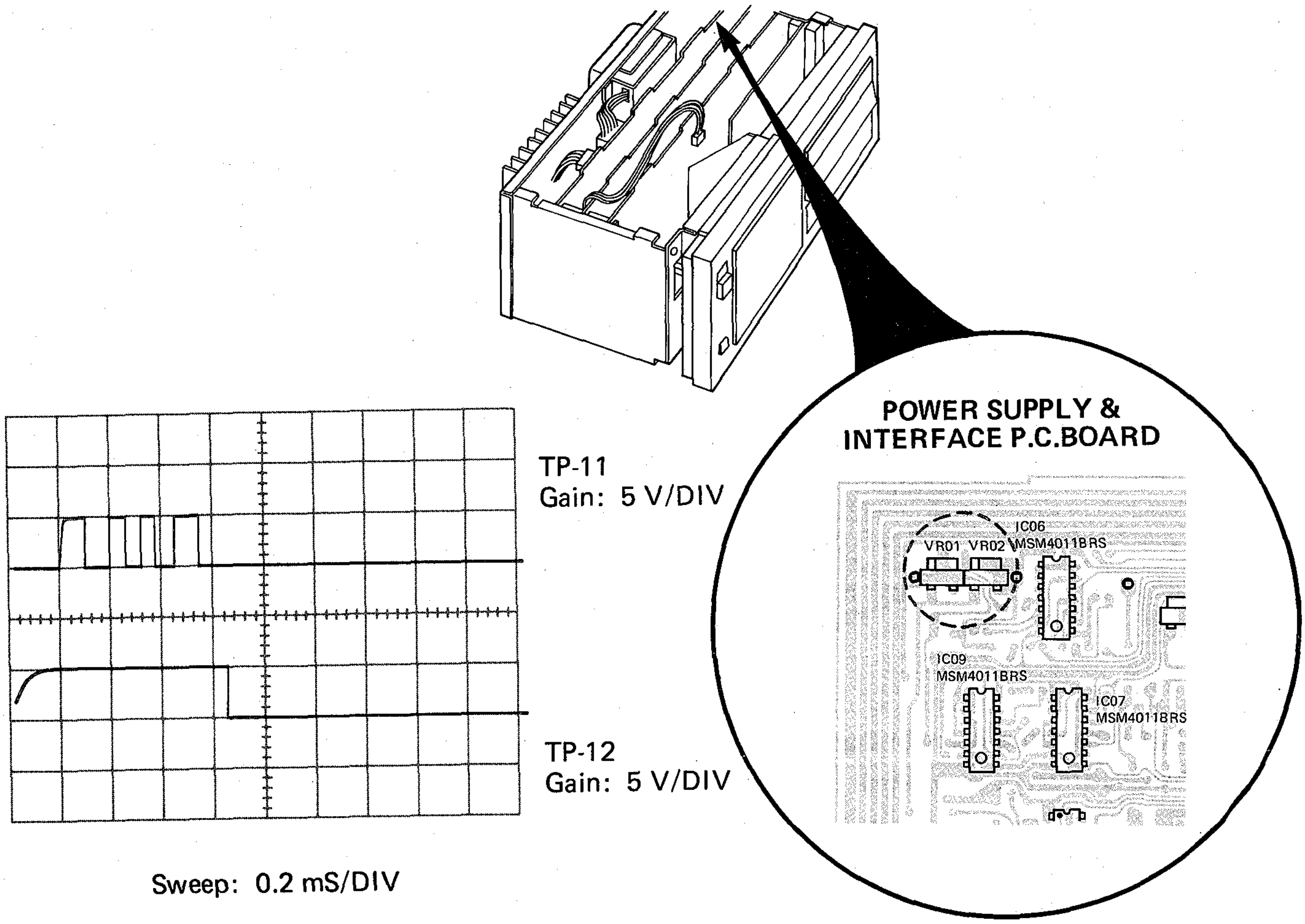
12. Lens Shift Range Adjustment

12-1 Set the dualtrace synchroscope to the sweep speed of 0.2 mS/DIV.
Set HFD TP-11 (5 V/DIV) on CH1 and TSO TP-12 (5 V/DIV) on CH2.
Note: Apply trigger at the increasing point of CH2.


Dusltrace Synchroscope
CH1
Sweep: 0.2 mS/DIV
Gain: 5 V/DIV
SERVO P.C.BOARD
VR205
TP-11
(HFD)
TP-12
(TSO)
IC208
MSM4049RS
IC212
MSM4011BRS
IC205
HD74LS08P
IC211
MSM4011BRS
IC207
LA6458DS
CH2
Sweep: 0.2 mS/DIV
Gain: 5 V/DIV

12-2 Load the unit with YEDS4 disc and reproduce the second program.

12-3 Press the Pause button and adjust VR01 (for IN shift range setting), so that the stabilized four pulses appear in the wave form of HFD TP-11 as illustrated.

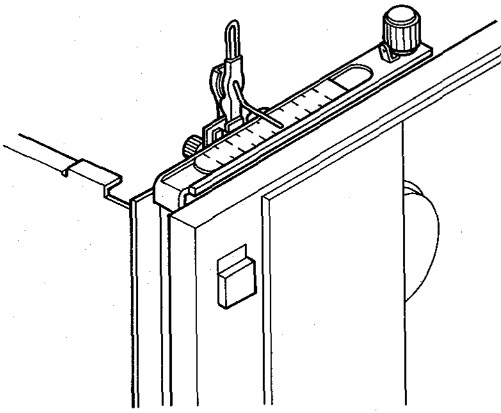

TP-11
Gain: 5 V/DIV
TP-12
Gain: 5 V/DIV
Sweep: 0.2 mS/DIV
POWER SUPPLY & INTERFACE P.C.BOARD
VR01
VR02
IC06
MSM4011BRS
IC09
MSM4011BRS
IC07
MSM4011BRS

12-4 Set VR02 (for OUT shift range setting) to the position obtained by turning it 15°CCW from the adjusting position of VR01.

12-5 After the adjustment, confirm that the program selection system works smoothly.

13. Pickup Motor Shifting Speed Adjustment

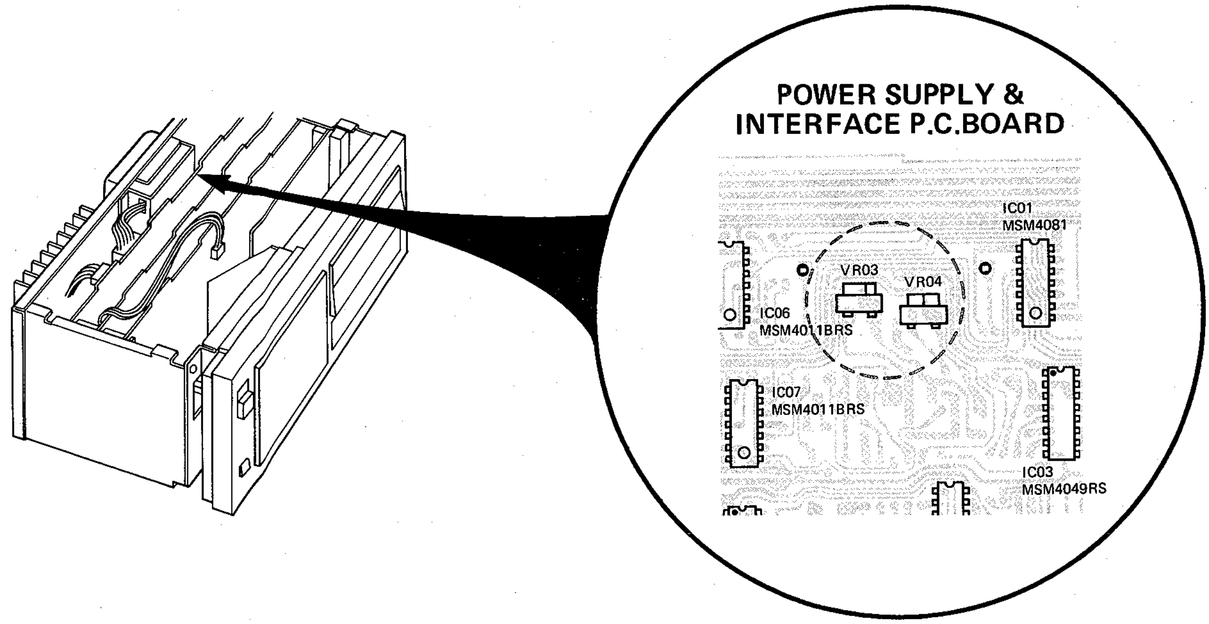
13-1 Load the unit with YEDS4 disc and attach the pointer (Jig) on the upper section of the pickup.



13-2 Reserve the 12th and 1st programs and reproduce them.
Mark on the disc the starting positions of the 12th and 1st programs with a thin-tip black magic pen.

13-3 Use skip function from the 12th program to the 1st program. Adjust VR04 for IN shift range setting 3 to 4 mm before the marked starting position of the 1st program.

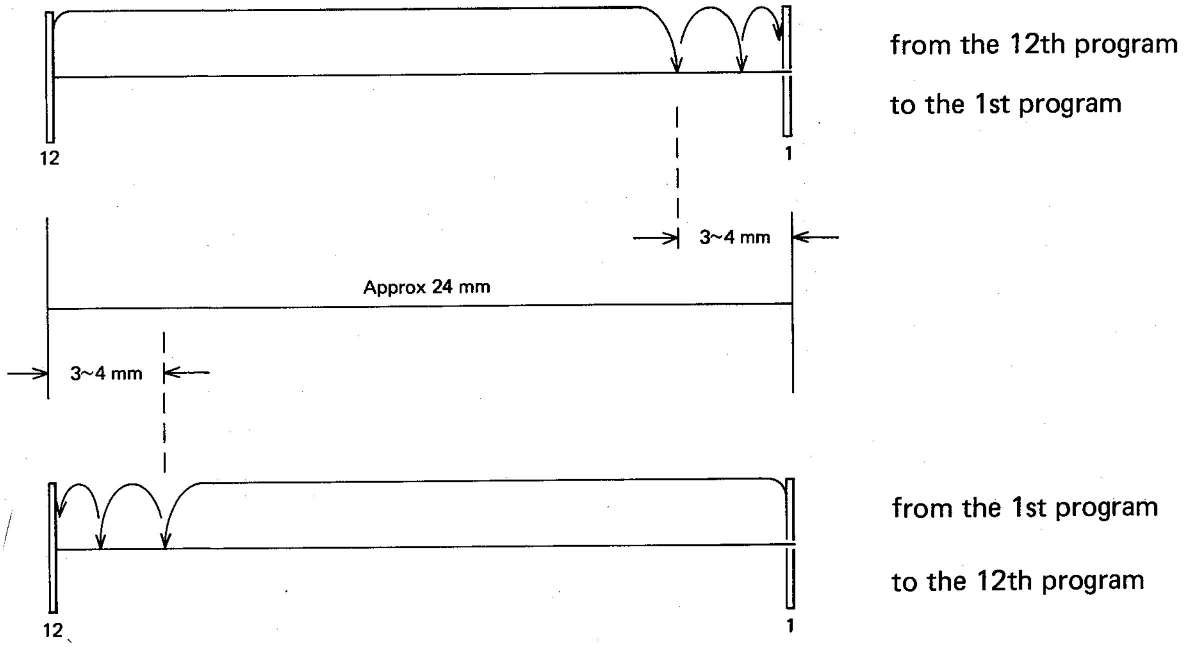
13-4 Use skip function from the 1st program to the 12th program. Adjust VR03 for OUT shift range setting 3 to 4 mm before the marked starting position of the 12th program.


POWER SUPPLY &
INTERFACE P.C.BOARD
IC01
MSM4081
VR03
VR04
IC06
MSM4011BRS
IC07
MSM4011BRS
IC03
MSM4049RS

13-5 Repeat the above items 13-3 and 13-4 several times until the correct VR settings are obtained.

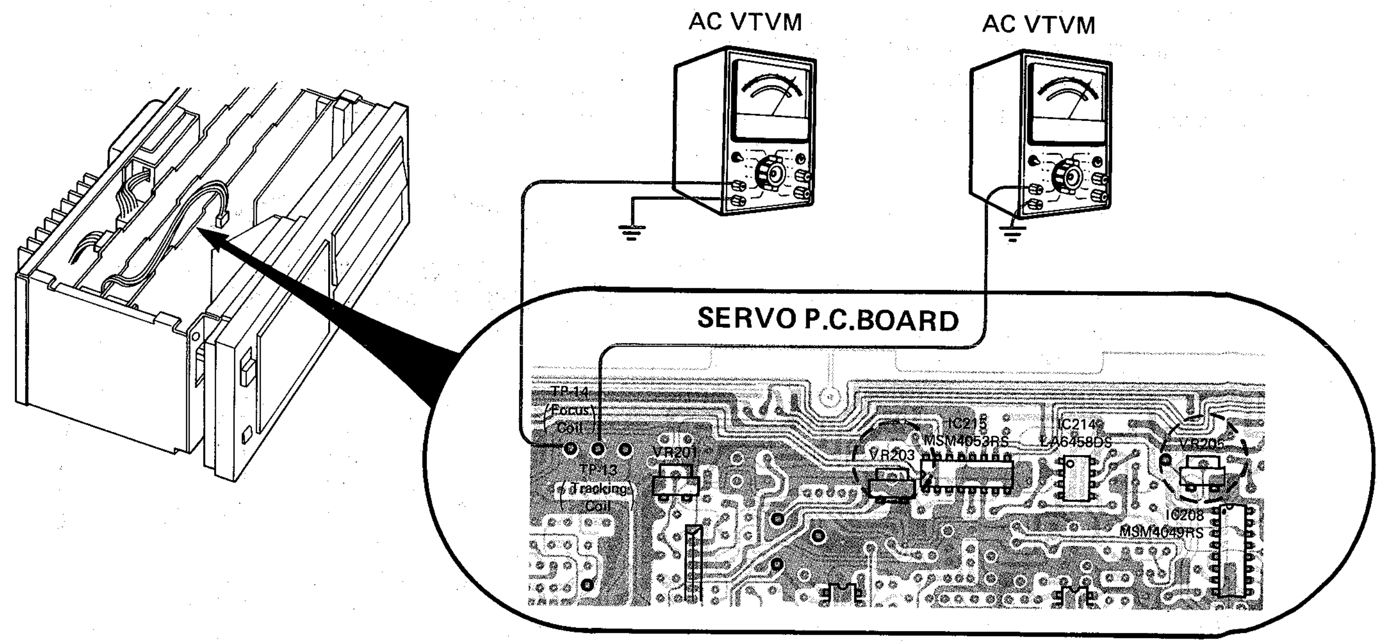
13-6 Remove the pointer from the pickup.
Note: After the above adjustment, the shifting speed of the pickup becomes approximately 16 mm/sec.

Shifting Speed Setting of Pickup Motor (Reference)


from the 12th program
to the 1st program
12
1
3~4 mm
Approx 24 mm
3~4 mm
from the 1st program
to the 12th program
12
1

14. Focus and Tracking Servo Gain Adjustment

14-1 Load the unit with YEDS4 disc and reproduce the 1st program.


AC VTVM
AC VTVM
SERVO P.C.BOARD
TP-14 (Focus Coil)
TP-13 (Tracking Coil)
VR201
VR203
IC215 MSM4053RS
IC214 LA6458DS
VR205
IC208 MSM4049RS

14-2 Connect the AC voltmeter (VTVM or Multimeter) to TP-14 and adjust VR203 focus servo gain for a VTVM reading of 80 mV.

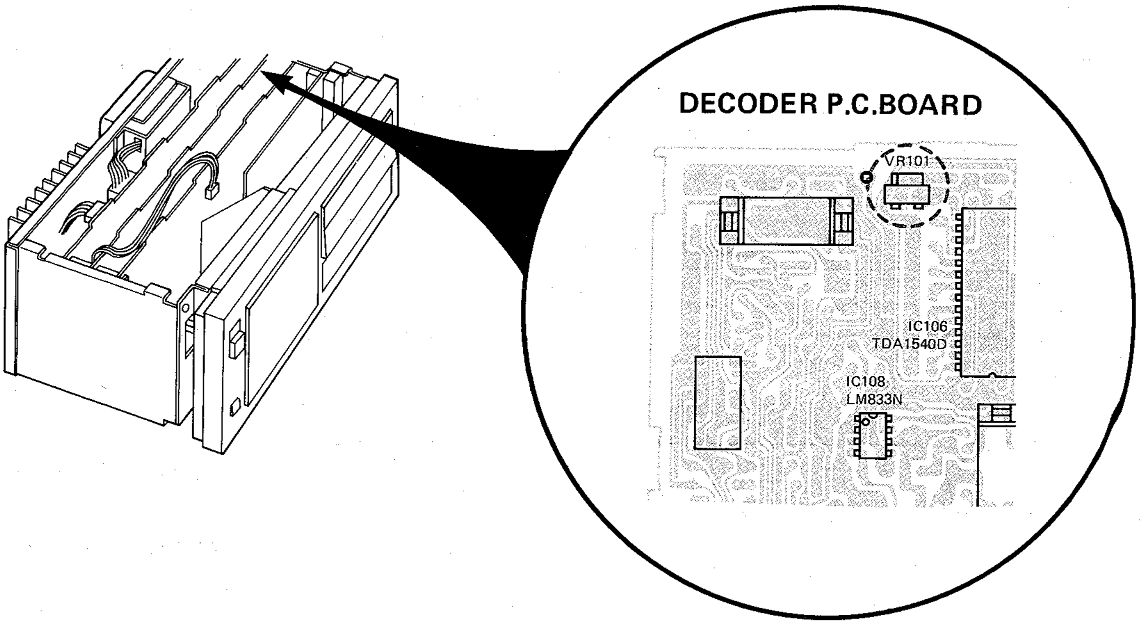
14-3 Connect the AC voltmeter (VTVM or Multimeter) to the tracking coil (TP-13) and adjust VR205 tracking servo gain for a VTVM reading of 1.5 V.

14-4 Disconnect all connections.

15. Right and Left Channel Balance Adjustment

15-1 Load the unit with "TEST SAMPLE 3" disc and reproduce the 3.15 kHz signal of TRACK No. 19.

15-2 Observe the output level of the right channel. Adjust the balance VR101 on Decoder P.C.Board, for equal output level of the left and the right channels.


DECODER P.C.BOARD
VR101
IC106
TDA1540D
IC108
LM833N

FUNCTION OF COMPACT DISC PLAYER

FOCUSING SERVO SYSTEM

When the disc signals are read, the laser should always be focused on the signal surface. The distance between the pickup and the disc surface changes with the disc rotation. The focusing servo system is used to automatically focus the laser beam on the signal surface.

"Critical Angle" is used to detect the distance between the signal surface of the disc and the objective of the pickup. As shown in Fig. 1, the rays reflected from the disc become parallel through the objective when they are in focus.

As the prism is adjusted to be at critical angle against the angle of incidence, all parallel rays running through the prism are reflected and an equal quantity of radiation reaches PD1 and PD2 which is an indication that the objective is properly focused.

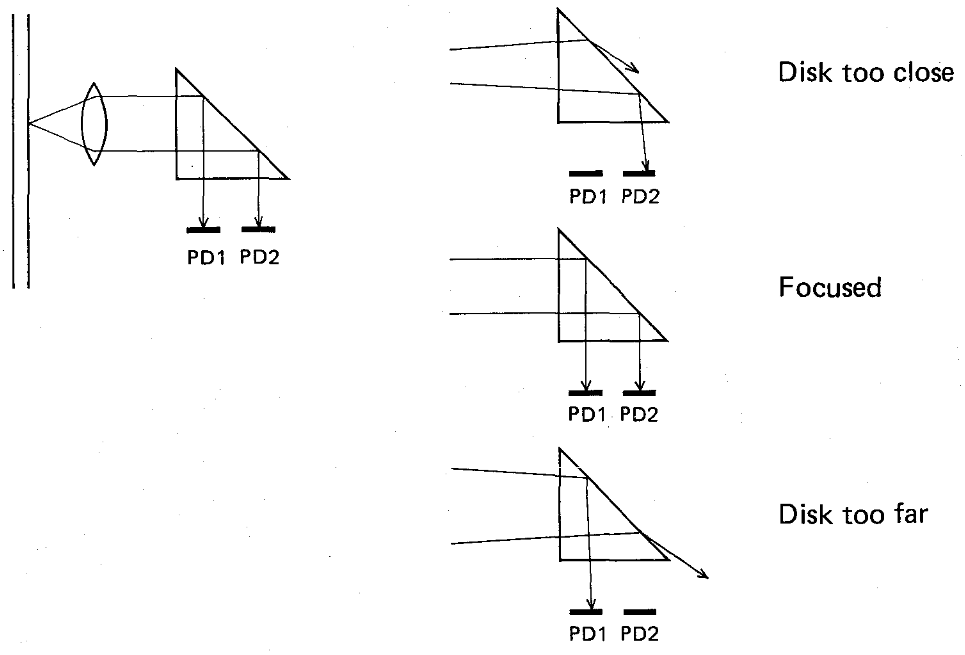


Fig. 1

When the disk is located too close to the objective, the rays through the objective become diverged and the quantity of radiation received by PD1 decreases. When located too far, the rays become converged and the quantity received by PD2 decreases.

The focus servo system operates on these signals. The actual circuit consists of the focus error detection circuit, focus search circuit, phase compensation circuit, and output circuit.

FOCUS ERROR DETECTION CIRCUIT

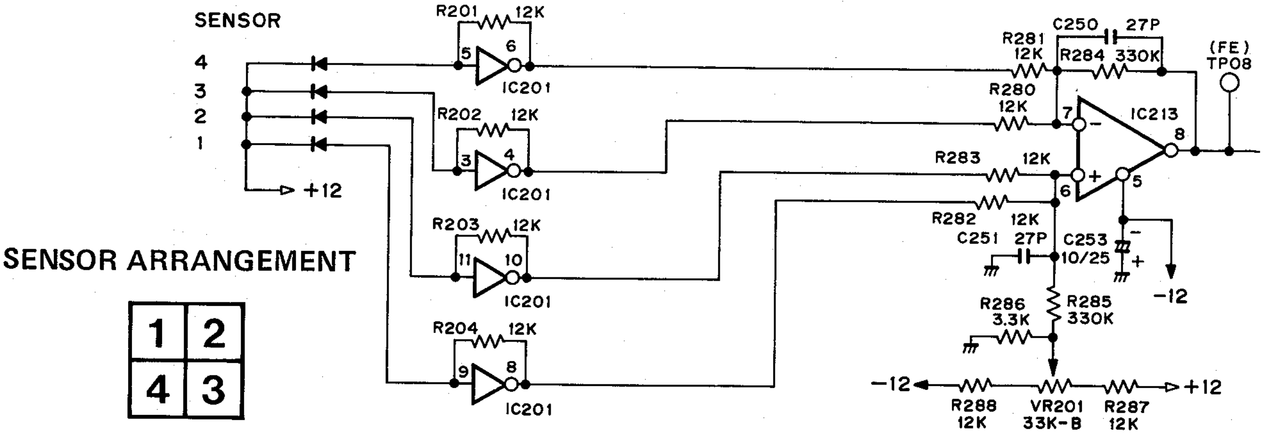

SENSOR
4
3
2
1
+12
SENSOR ARRANGEMENT
1 2
4 3
R201 12K
IC201
R202 12K
R203 12K
R204 12K
R281 12K
C250 27P
R284 330K
(FE) TP08
R280 12K
IC213
R283 12K
R282 12K
C251 27P
C253 10/25
R286 3.3K
R285 330K
-12
+12
R288 12K
VR201 33K-B
R287 12K

Fig. 2

PD1 consists of Sensors 1 and 2 and PD2 Sensors 3 and 4. The focus error signal (FE) is the difference between PD1 and PD2, its formula is FE=(1+2)–(3+4).

FOCUS SEARCH CIRCUIT

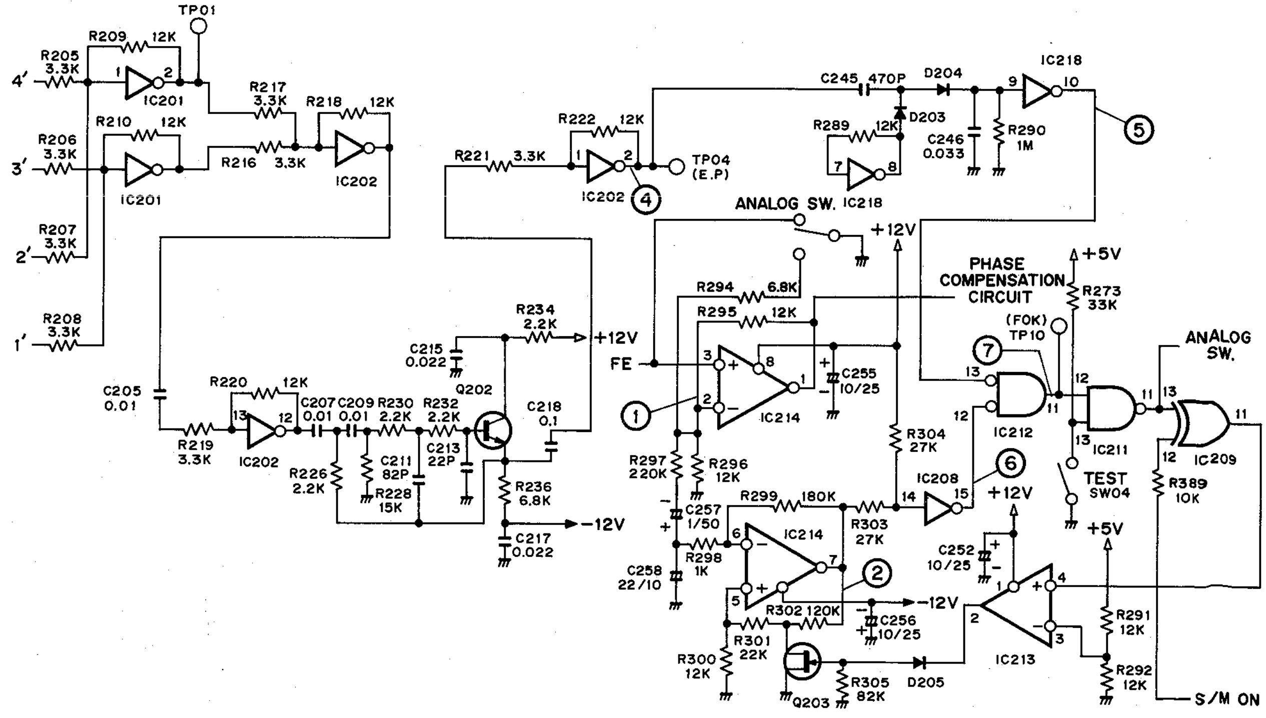

TP01
R205 3.3K
R206 3.3K
R207 3.3K
R208 3.3K
4'
3'
2'
1'
R209 12K
R210 12K
IC201
R217 3.3K
R218 12K
R216 3.3K
IC202
C205 0.01
R219 3.3K
R220 12K
C207 0.01
C209 0.01
R230 2.2K
R232 2.2K
Q202
R226 2.2K
C211 82P
R228 15K
C213 22P
C215 0.022
R234 2.2K
+12V
C218 0.1
R236 6.8K
-12V
C217 0.022
R221 3.3K
R222 12K
TP04 (E.P)
④
C245 470P
D204
D203
R289 12K
C246 0.033
R290 1M
IC218
⑤
ANALOG SW. IC218
FE
R294 6.8K
R295 12K
C255 10/25
IC214
①
R297 220K
R296 12K
C257 1/50
R299 180K
R298 1K
C258 22/10
R302 120K
R301 22K
R300 12K
Q203
C256 10/25
R305 82K
D205
R303 27K
R304 27K
②
IC208
⑥
PHASE COMPENSATION CIRCUIT
(FOK) TP10
⑦
+5V
R273 33K
IC212
IC211
ANALOG SW.
IC209
R389 10K
TEST SW04
C252 10/25
IC213
R291 12K
R292 12K
S/M ON

Fig. 3

The focus search circuit consists of a 1 Hz oscillator, the focus OK analyzer, and an analog switch. When the analog switch conducts current flows from Pin 3 of IC214 into GND at the start and Q203 is turned off generating the 1 Hz signal. Then, the saw-tooth wave is fed into Pin 2 of IC214. This shifts the objective back and forth about ±1 mm, searching for the proper focal point.

The sum HF (HF=1+2+3+4) of the outputs of the four sensors becomes large when the objective is in focus and the focus OK signal ⑤ as shown in Fig. 4 is generated at Pin 10 of IC218. If the oscillation of 1 Hz is positive (+), it shows that the signal on Pin 15 of IC208 is at "L" level.
The analog switch is inverted and the servo is turned on by the signal obtained when the OK signal and the signal at "L" level have passed through the NAND circuit.
Q203 is turned on at the same time to stop the 1 kHz oscillation.

FOCUS SEARCH CIRCUIT TIME CHART

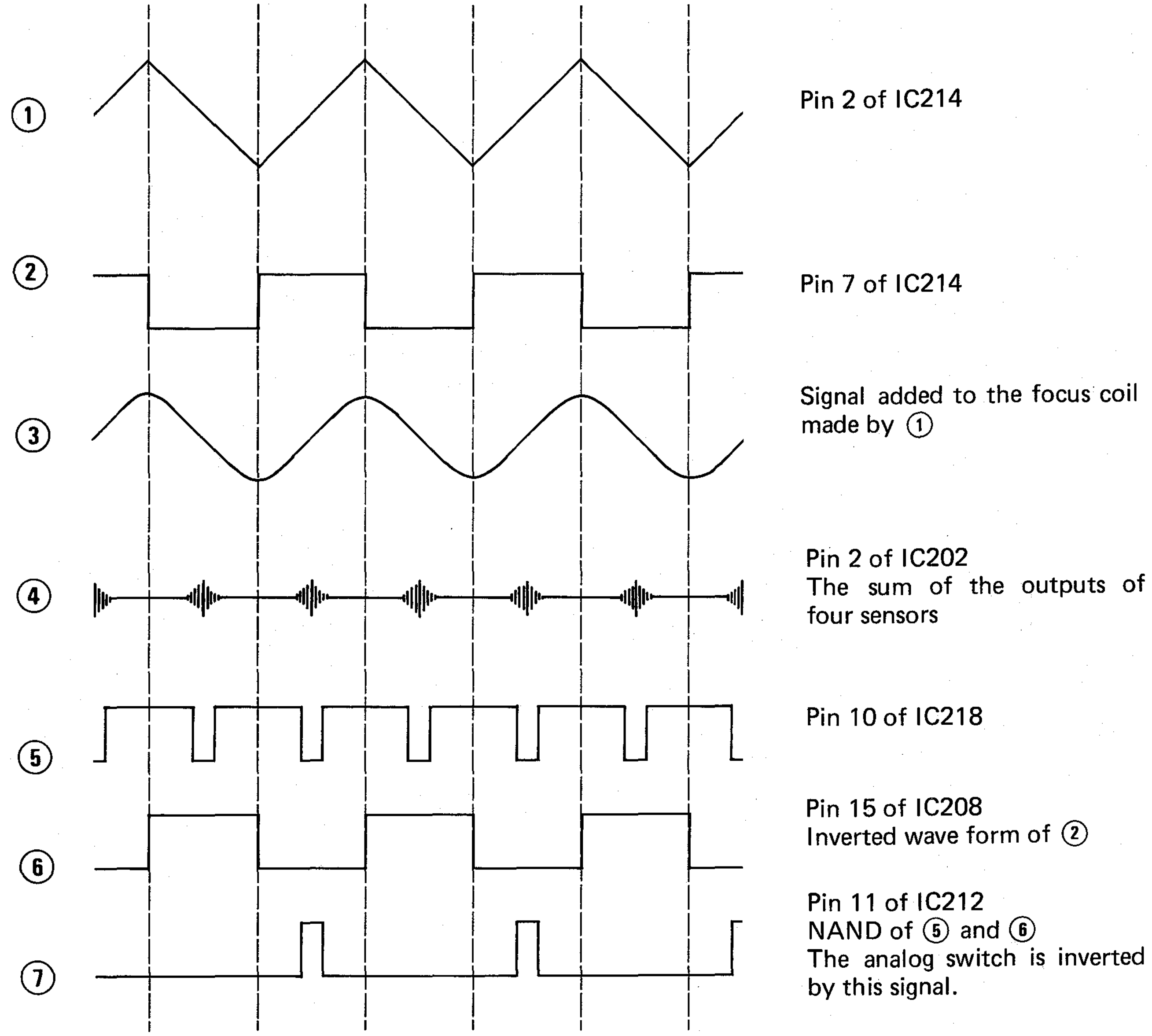

①
Pin 2 of IC214
②
Pin 7 of IC214
③
Signal added to the focus coil made by ①
④
Pin 2 of IC202
The sum of the outputs of four sensors
⑤
Pin 10 of IC218
⑥
Pin 15 of IC208
Inverted wave form of ②
⑦
Pin 11 of IC212
NAND of ⑤ and ⑥
The analog switch is inverted by this signal.

Fig. 4

PHASE COMPENSATION AND OUTPUT CIRCUIT (FOCUSING SERVO SYSTEM)

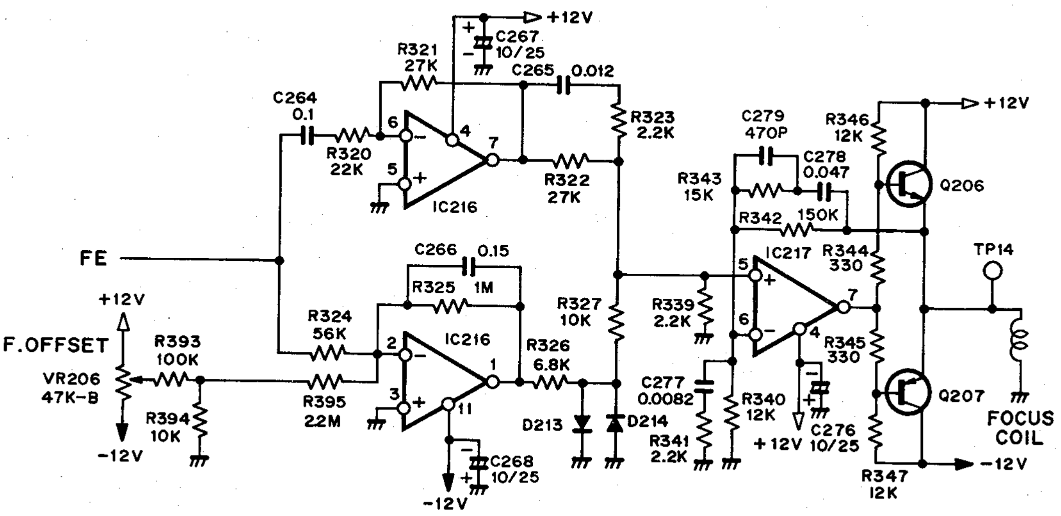

+12V
C267
10/25
R321
27K
C265 0.012
C264
0.1
R320
22K
IC216
R322
27K
R323
2.2K
C279
470P
R346
12K
C278
0.047
R343
15K
R342 150K
Q206
+12V
FE
C266 0.15
R325 1M
IC217
R344
330
TP14
+12V
F.OFFSET
VR206
47K-B
R393
100K
R394
10K
-12V
R324
56K
R395
22M
R327
10K
R326
6.8K
R339
2.2K
R345
330
C277
0.0082
D213
D214
R341
2.2K
R340
12K
C276
10/25
+12V
Q207
FOCUS
COIL
-12V
R347
12K
C268
10/25
-12V

Fig. 5

The phase compensation signal is processed by two amplifiers (IC216) and split into two frequency band sections; one amplifier processes frequencies below 30 Hz, the other amplifier process frequencies above 30 Hz. In case of frequencies below 30 Hz, the amplifier is increased by 25 dB to obtain the required level. For frequencies above 30 Hz, the phase is shifted for the stabilization. The focus coil of the pickup has a sensitivity of 1.7 mm/±0.5 V. Approximately 200 mVp-p of alternating current is applied to the coil in the focused condition.

TRACKING SERVO SYSTEM

While the focus servo shifts the objective up and down to focus the objective on the disc, this system shifts it right and left to trace the disk tracks. To detect if proper tracking is obtained, a phase difference detection is performed by comparing the phase of the signals of the 4 sensors.
Fig. 6 explains how the detection is performed. As the shadow of the pit passes over the four sensors equally dividing them into two areas in "ON TRACK" condition, the wave forms of four sensors (1+3 and 2+4) set diagonally in array gain the same phase and level. Therefore, the difference DL (DL=(1+3)–(2+4)) becomes "0" (zero).
If the shadow runs off the track on the left side, it passes over the sensors 1 and 4 in that order. Then, the phase of DL advances 90 degrees as compared with that of HF signal (1+3+2+4). If the shadow runs off the track on the right side, it passes over the sensors 2 and 3 in that order and the phase of DL is delayed 90 degrees.

PRINCIPLE OF TRACKING DETECTION

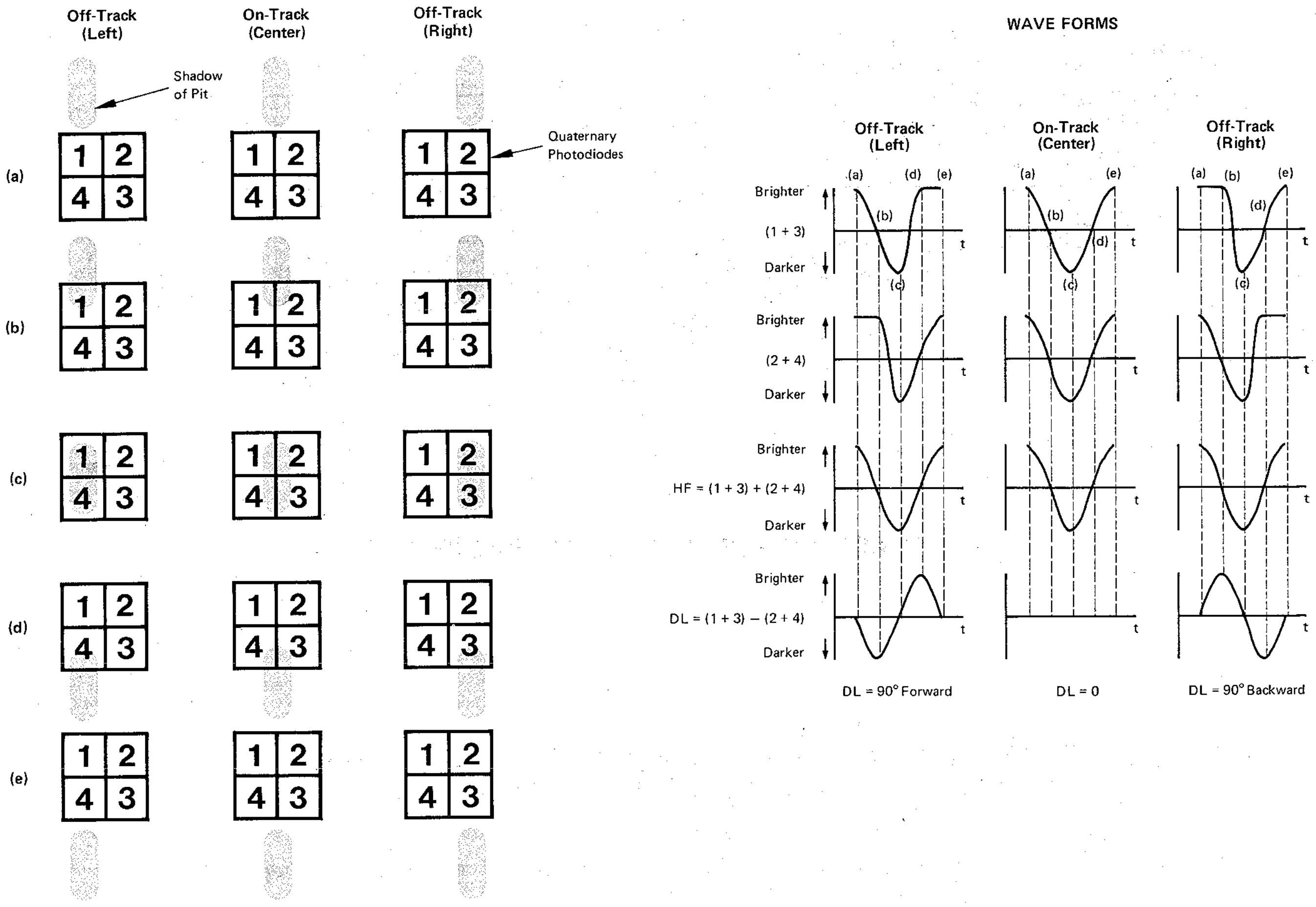

Off-Track (Left)
On-Track (Center)
Off-Track (Right)
Shadow of Pit
Quaternary Photodiodes
(a)
(b)
(c)
(d)
(e)
1
2
4
3
WAVE FORMS
Off-Track (Left)
On-Track (Center)
Off-Track (Right)
Brighter
(1 + 3)
Darker
Brighter
(2 + 4)
Darker
Brighter
HF = (1 + 3) + (2 + 4)
Darker
Brighter
DL = (1 + 3) − (2 + 4)
Darker
t
DL = 90° Forward
DL = 0
DL = 90° Backward

Fig. 6

In the actual circuit, both HF (1+2+3+4) and DL ((1+3)−(2+4)) signals at the output of the 4 sensors are detected. A pulse called "PGR" is generated at the leading edge of HF and a pulse called "PGF" at the trailing edge. The signals DLP1 (DL+PGR) and DLP2 (DL+PGF) are also formed and envelope-detected. Then, TE1 and TE2 are formed. These are servo-actuated by TE (TE=TE1−TE2). Figs. 7 and 8 show these circuits and their signal wave forms.
The band-pass filters consisting of Q201 and Q202 pass only frequencies of 2 kHz to 1 MHz and are used as a countermeasure against scratches on the disc.

TRACKING SERVO CIRCUIT

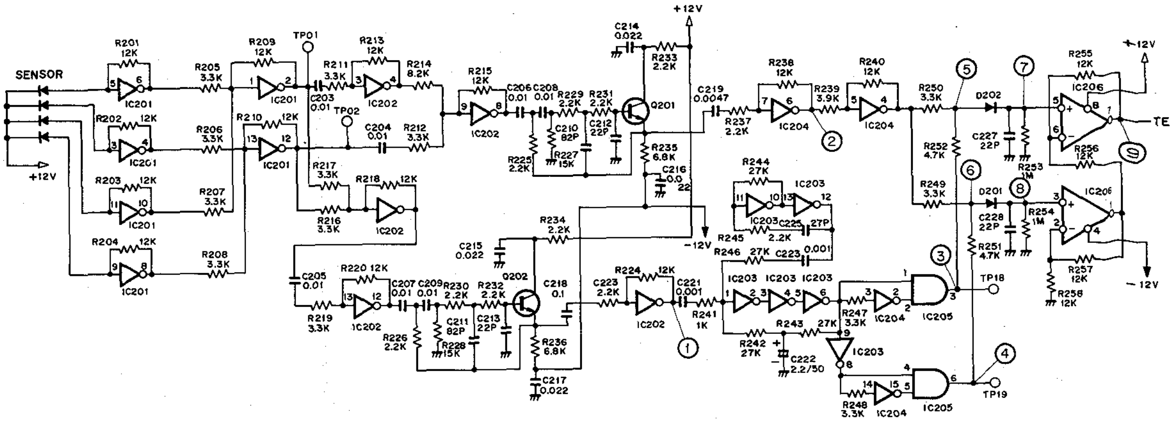

SENSOR
+12V
-12V
IC201
IC202
IC203
IC204
IC205
IC206
Q201
Q202
TP01
TP02
TP18
TP19
D201
D202
TE
①
②
③
④
⑤
⑥
⑦
⑧
⑨

Fig. 7

TRACKING SERVO CIRCUIT TIME CHART

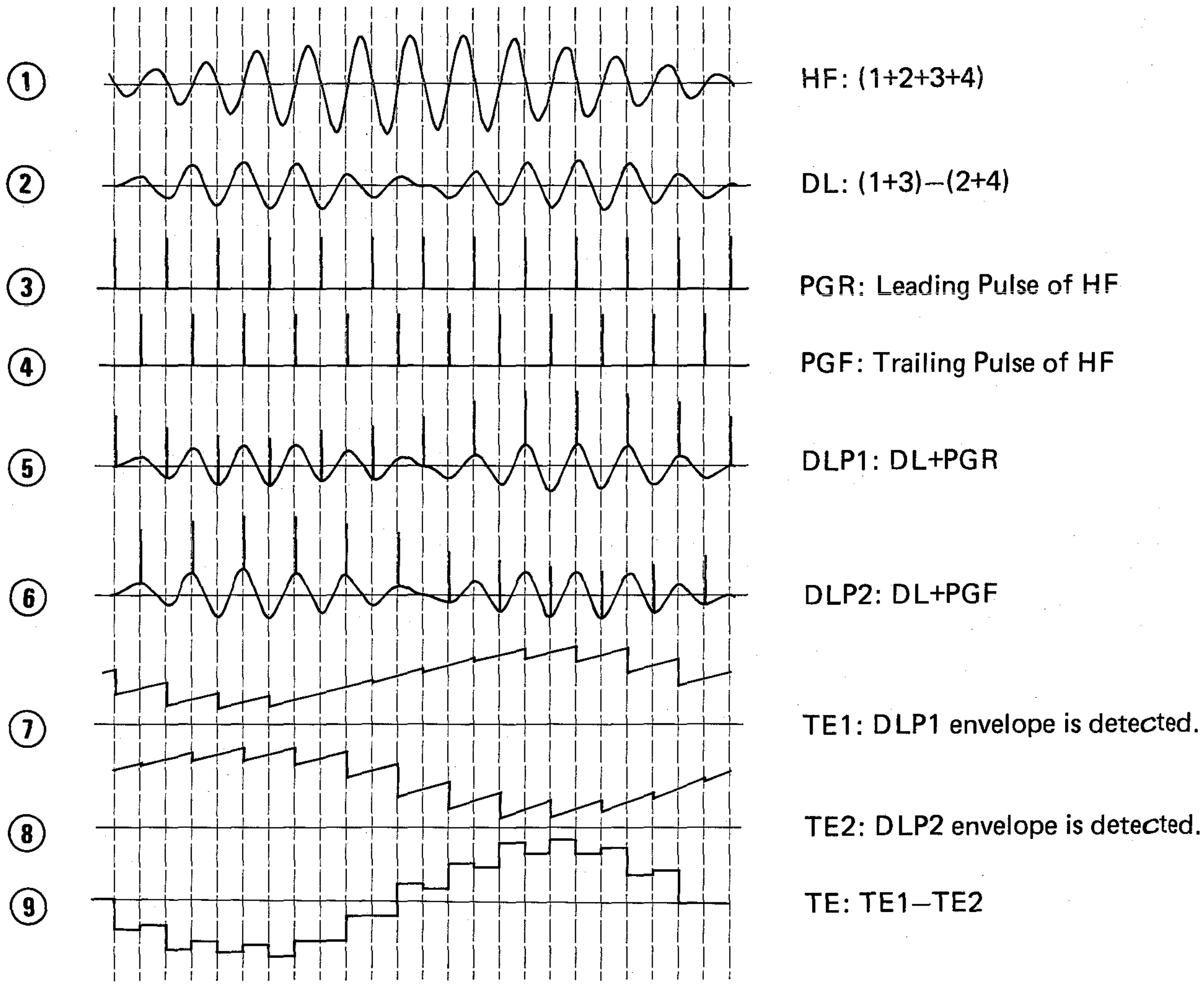
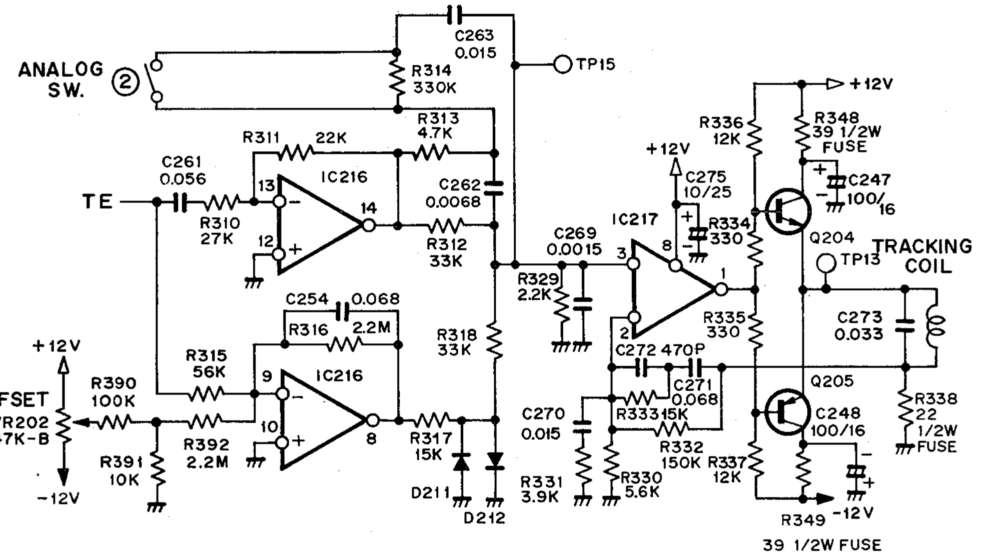


Fig. 8

PHASE COMPENSATION AND OUTPUT CIRCUITS (TRACKING SERVO SYSTEM)

The phase compensation and output circuits are processed by two amplifiers and split into two band sections for the stabilization.



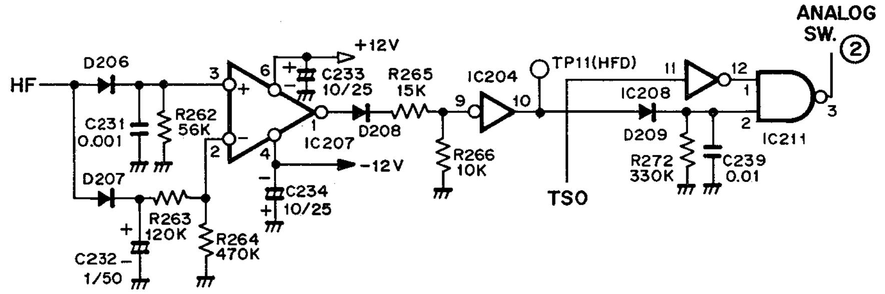
ANALOG SW. ②
C263 0.015
R314 330K
TP15
+12V
R313 4.7K
R311 22K
C261 0.056
TE
R310 27K
IC216
13
14
12
C262 0.0068
R312 33K
R336 12K
R348 39 1/2W FUSE
+12V
C275 10/25
C247 100/16
IC217
R334 330
C269 0.0015
Q204
TP13
TRACKING COIL
R329 2.2K
C254 0.068
R316 2.2M
R318 33K
R335 330
C273 0.033
+12V
R315 56K
C272 470P
C271 0.068
Q205
T.OFFSET
R390 100K
9
IC216
R333 15K
R338 22 1/2W FUSE
VR202 47K-B
10
8
C270 0.015
C248 100/16
R391 10K
R392 2.2M
R317 15K
R332 150K
R337 12K
-12V
D211
D212
R331 3.9K
R330 5.6K
R349 39 1/2W FUSE
-12V

Fig. 9

COUNTERMEASURE AGAINST SCRATCH SHOCKS

The scratches on the disk appear as dropouts of the HF signals. These dropouts must be detected to take some countermeasures against scratches. Fig. 10 shows the dropout (HFD) detection circuit. If a HF signal flows in the circuit, Pin 1 output of IC207 is set at "H" level because the potential of Pin 2 has been divided by R263 and R264 and the voltage at Pin 3 is higher than that at Pin 2. When no HF signal flows in the circuit due to a dropout, the voltage at Pin 2 becomes higher than that of Pin 3 and the output is set at "L" level because C232 needs more discharge time than C231.

HFD output is not only used in the Servo P.C.Board but also supplied to the Decoder P.C.Board. When HFD is set at "L" level, the output opens the PLL loop of 4.3 MHz. When a scratch is detected, Pin 3 of IC211 becomes "L", the analog switch ② is changed over to release C263 (0.015 μF) and to damp the servo reaction.



ANALOG SW. ②
+12V
HF
D206
3
6
C233 10/25
R265 15K
IC204
TP11(HFD)
11
12
C231 0.001
R262 56K
1
IC207
D208
9
10
IC208
1
2
3
IC211
2
4
D209
-12V
R266 10K
R272 330K
C239 0.01
D207
C234 10/25
TSO
R263 120K
R264 470K
C232 1/50

Fig. 10

The analog switch ② is used as one of the countermeasures against scratches. Therefore, Pin 1 of IC211 must be kept at "L" level to prevent the analog switch ② from being changed over as for a HF signal dropout which occurs during the program selection.

FEED SERVO CIRCUIT

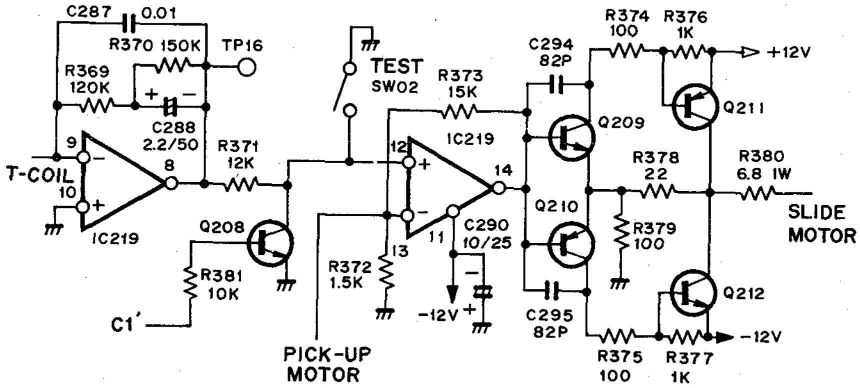

C287 0.01
R370 150K
TP16
R369 120K
C288 2.2/50
9
8
10
T-COIL
IC219
R371 12K
Q208
R381 10K
C1'
TEST SW02
R373 15K
IC219
12
14
13
11
C290 10/25
R372 1.5K
-12V
PICK-UP MOTOR
C294 82P
R374 100
R376 1K
+12V
Q209
Q211
R378 22
R380 6.8 1W
Q210
R379 100
SLIDE MOTOR
Q212
C295 82P
R375 100
R377 1K
-12V

Fig. 11

The time of reproduction covered only by the shifting of the objective with the pickup fixed is approximately 20 seconds. The objective is located at center when current does not flow through the tracking coil. If it is off-centered, DC current flowing through the coil is detected and the slide motor is activated to keep the current as little as possible, so that the objective is re-centered. Fig. 11 shows the feed servo circuit.

LASER RADIATION CIRCUIT

A semi-conductor laser is used in the pickup of the compact disc player. The chip, whose size is very small (0.1 x 0.3 x 0.2 mm), radiates laser when a current of 30 – 50 mA flows through it. Because the energy density is very high, fast deterioration of the semi-conductor laser will occur with overcurrent. The laser output is affected by changes in temperature. Its efficiency decreases at high temperature. As the quantity of radiation emitted is not proportional to the current flow through the semiconductor, it must be controlled by a monitor diode. Fig. 12 shows the circuit.

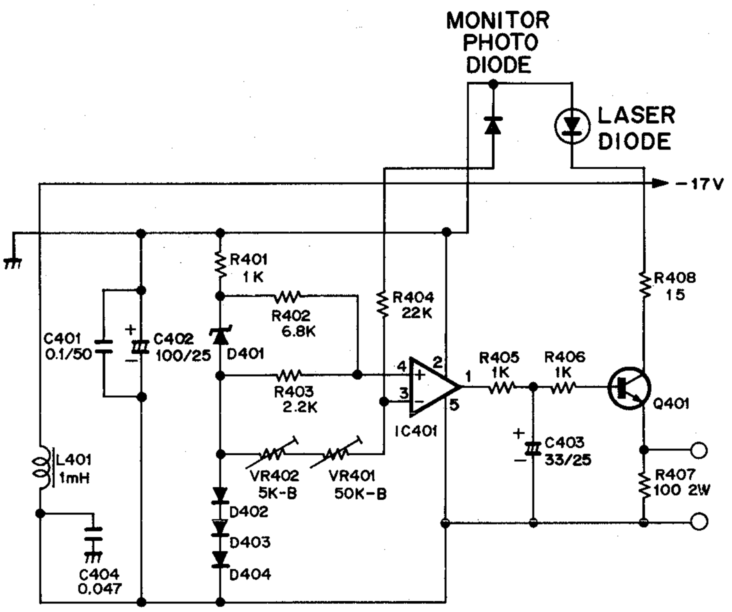

MONITOR PHOTO DIODE
LASER DIODE
-17V
R401 1K
R402 6.8K
R404 22K
R408 15
C401 0.1/50
C402 100/25
D401
R403 2.2K
4
2
3
1
5
IC401
R405 1K
R406 1K
Q401
C403 33/25
L401 1mH
VR402 5K-B
VR401 50K-B
R407 100 2W
D402
D403
D404
C404 0.047

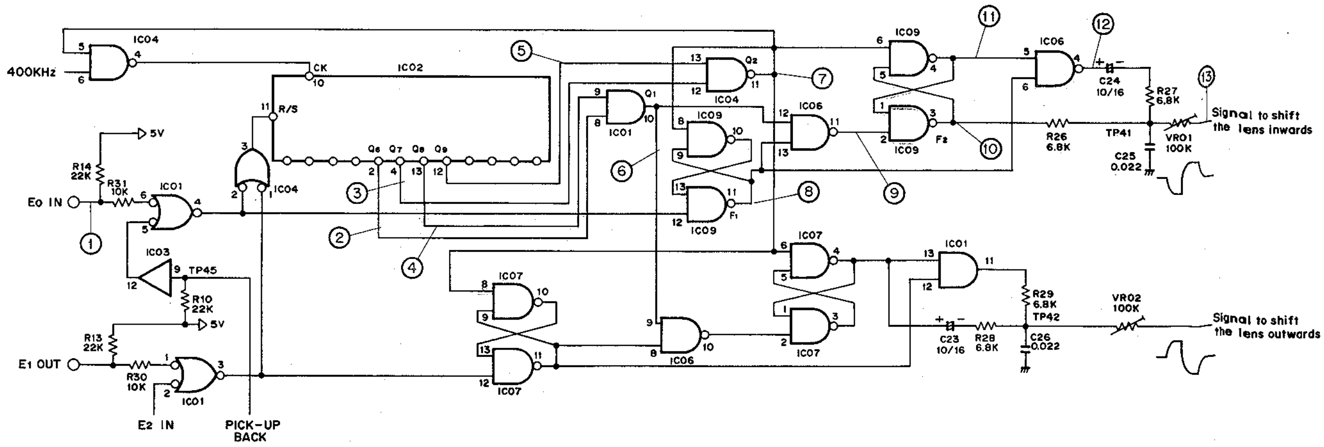
Fig. 12

The 1 mH coil is used to suppress surge voltages from the power source. D402, D403, and D404 are used to bias IC401.

Supposing that the quantity of radiation from the laser diode has increased, the quantity of radiation received by the monitor diode also increases and its resistance decreases gradually. Although the positive (+) input voltage of IC401 is kept constant, the negative (–) input voltage increases and the output of IC401 decreases following the resistance change. Therefore, the current flowing in the laser diode decreases and the quantity of radiation is kept constant. If the quantity of radiation has decreased, the reverse process is made in the circuit to keep the radiation constant.

LENS SHIFT CIRCUIT

It is necessary to analyze the tracks one by one for the exact program selection and pause function of the compact disc. Therefore, the Lens Shift Circuit is used to jump the tracks to a certain extent. The lens is shifted by applying the signals to the tracking coil, so that four tracks are jumped inwards and three outwards. Fig. 13 shows the circuit diagram and Fig. 14 the time chart of the waveforms at each point.



400KHz
IC04
IC02
CK
R/S
Q6 Q7 Q8 Q9
5V
R14 22K
R31 10K
Eo IN
IC01
IC03
TP45
R10 22K
R13 22K
E1 OUT
R30 10K
E2 IN
PICK-UP BACK
①
②
③
④
⑤
⑥
⑦
⑧
⑨
⑩
⑪
⑫
⑬
Q1
Q2
F1
F2
IC06
IC07
IC09
C24 10/16
R27 6.8K
R26 6.8K
TP41
C25 0.022
VR01 100K
Signal to shift the lens inwards
R29 6.8K
TP42
C23 10/16
R28 6.8K
C26 0.022
VR02 100K
Signal to shift the lens outwards

Fig. 13

LENS SHIFT CIRCUIT TIME CHART

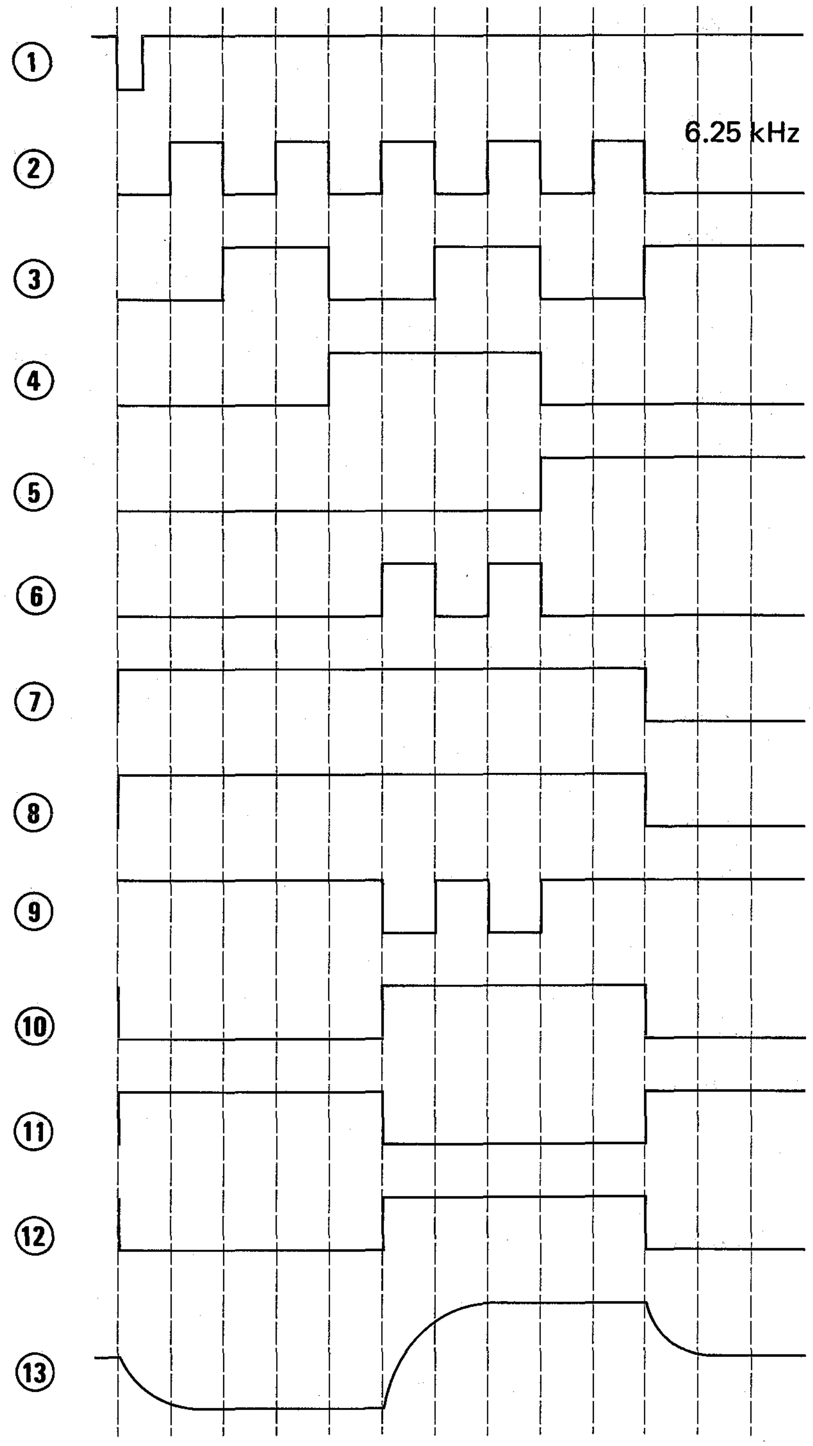


Fig. 14

When the signal ① to shift the lens inwards is fed from MICOM into the circuit, IC02 is reset and the signal of 400 kHz is fed through Pin 10. The wave forms ②, ③, ⑤, and ④, whose frequencies are divided into $1/2^6$, $1/2^7$, $1/2^9$, and $1/2^8$, are obtained by the signal through Pins 2, 4, 12, and 13 of IC02 and the signal ⑬ is produced to shift the lens inwards. When ⑦ becomes "L", Pin 10 of IC02 becomes "H" and the input signal at Pin 10 of IC02 is stopped. Similarly, the signal to shift the lens outwards appears as an inverted form of the wave form ⑬ by the signal from MICOM.

BRAKE CIRCUIT

At the program selection, the track jump current is applied to the feed motor and the tracking coil by the command from MICOM. The Brake Circuit is used to gain the stabilized tracking condition after the completion of the specified jump. Fig. 15 shows the circuit diagram and Fig. 16 the time chart of the wave forms at each point.

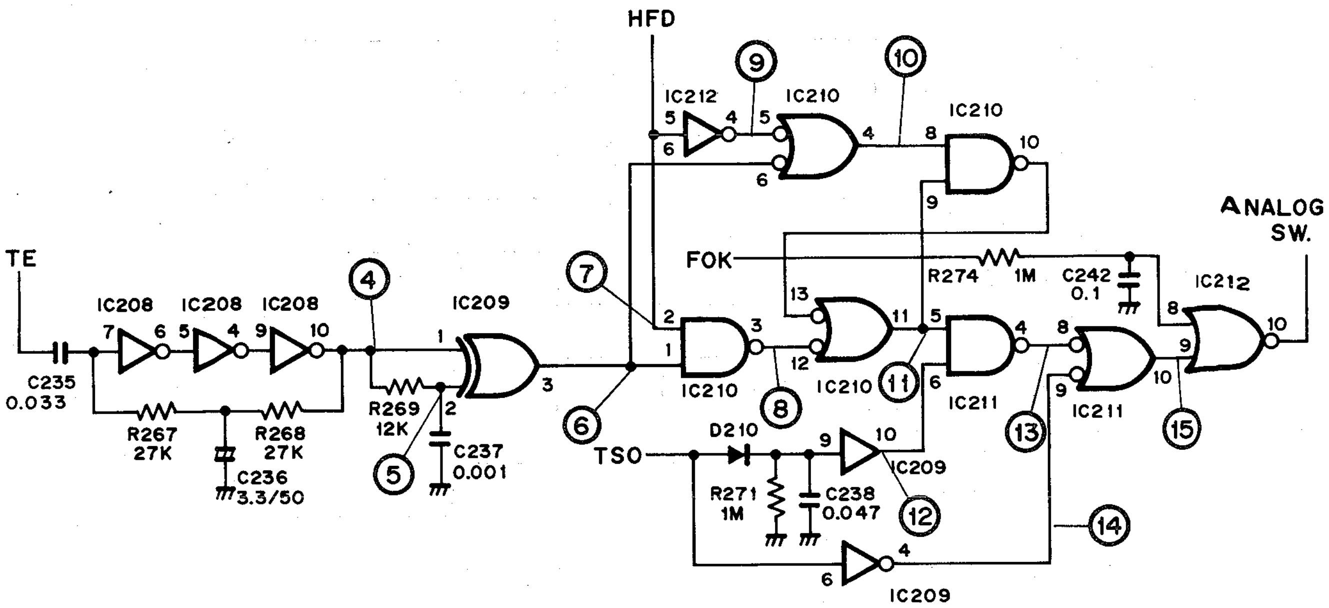

HFD
⑨
⑩
IC212
IC210
IC210
ANALOG SW.
TE
FOK
R274 1M
C242 0.1
IC212
IC208 IC208 IC208
④
IC209
⑦
C235 0.033
R267 27K
R268 27K
C236 3.3/50
R269 12K
C237 0.001
⑤
⑥
IC210
IC210
⑪
IC211
IC211
⑬
⑮
⑧
D210
TSO
IC209
R271 1M
C238 0.047
⑫
⑭
IC209

Fig. 15

BRAKE CIRCUIT TIME CHART

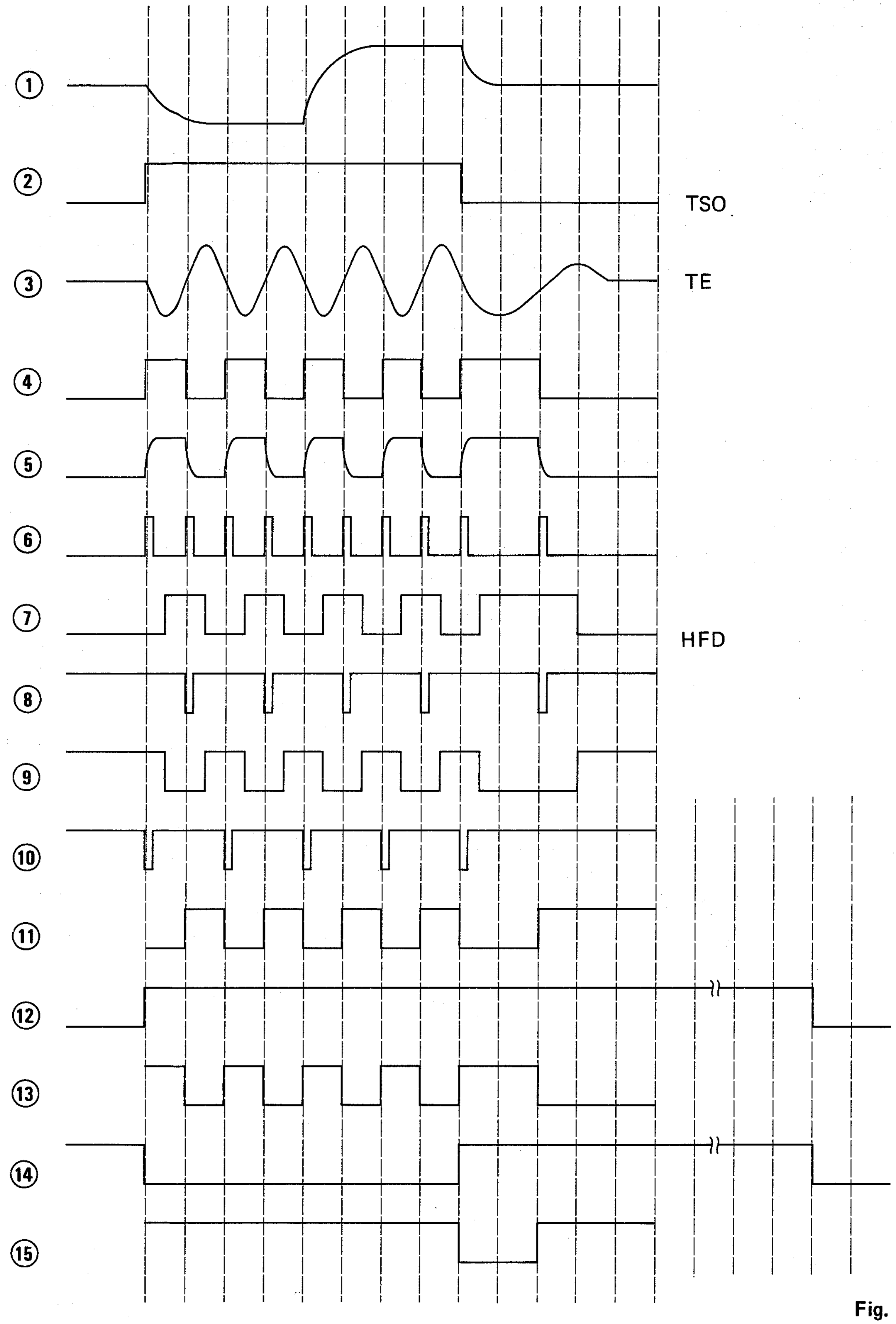
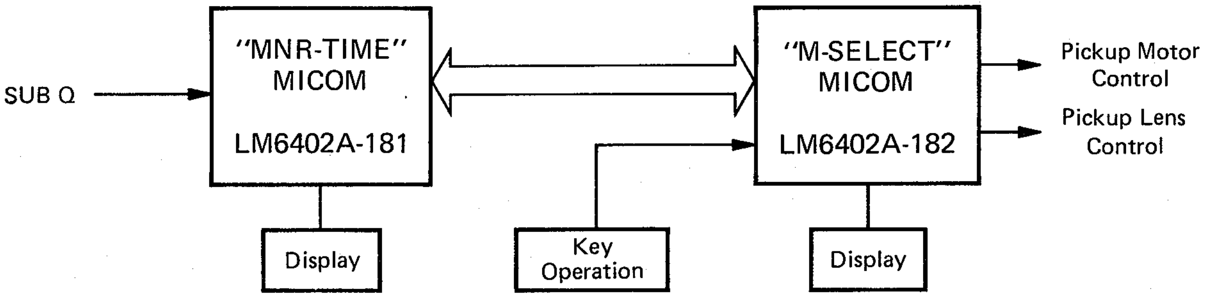

①
②
TSO
③
TE
④
⑤
⑥
⑦
HFD
⑧
⑨
⑩
⑪
⑫
⑬
⑭
⑮

Fig. 16

When the lens is shifted inwards, the wave form ① is applied to the pickup and shifts the lens four tracks inwards. At this time, the tracking servomechanism becomes "OFF" mode by setting TSO of the wave form ② at "H" level.
As HFD becomes "H" level if a dropout exists in the HF signal, the wave form ⑦ is obtained. Since the tracking error signal TE becomes "0" (zero) with a proper tracking obtained, the wave form ③ appears. The lowering part of the slope is the point crossing the tracks, where the wave form obtained after the wave form ② of TSO has become "L" must be braked by the Brake Circuit. These wave forms form the wave like ⑮ at Pin 10 of IC211. The lens is braked at the part in "L" level of the wave form ⑮ by the tracking servomechanism. The servomechanism is turned on again at the place where the wave form ⑫ is set at "L" level. The part at "L" level of the wave form ⑮, where the tracking servomechanism is turned on, is the place where the servomechanism works inversely to the lens-shifting direction.
The proper tracking is not obtained by the tracking servomechanism when FOK is at "H" level (when the lens is out of focus). Therefore, the tracking servomechanism is turned off to prevent undesirable DC current from flowing into the tracking coil.

CONFIGURATION OF MICOM

The compact disc system is designed considering that all functions are operated securely and speedily by MICOM. Two 4-bit microcomputers LM6402 are set in parallel and control the operations of the unit. One called "MNR-TIME" is mounted on the Display Micom P.C.B. Assembly. While it takes out the subcode Q (In this code, program numbers, time, etc., are restored.) from the compact disk signals and displays the track number, track time, absolute time, and remaining time, it also provides the information required in response to the commands issued from the other microcomputer.
The other one called "M-SELECT" is mounted on the Program Micom P.C.B. Assembly and controls the mechanism which performs the program selection, etc., with the signals inputted by the key operation and the time data from "MNR-TIME".



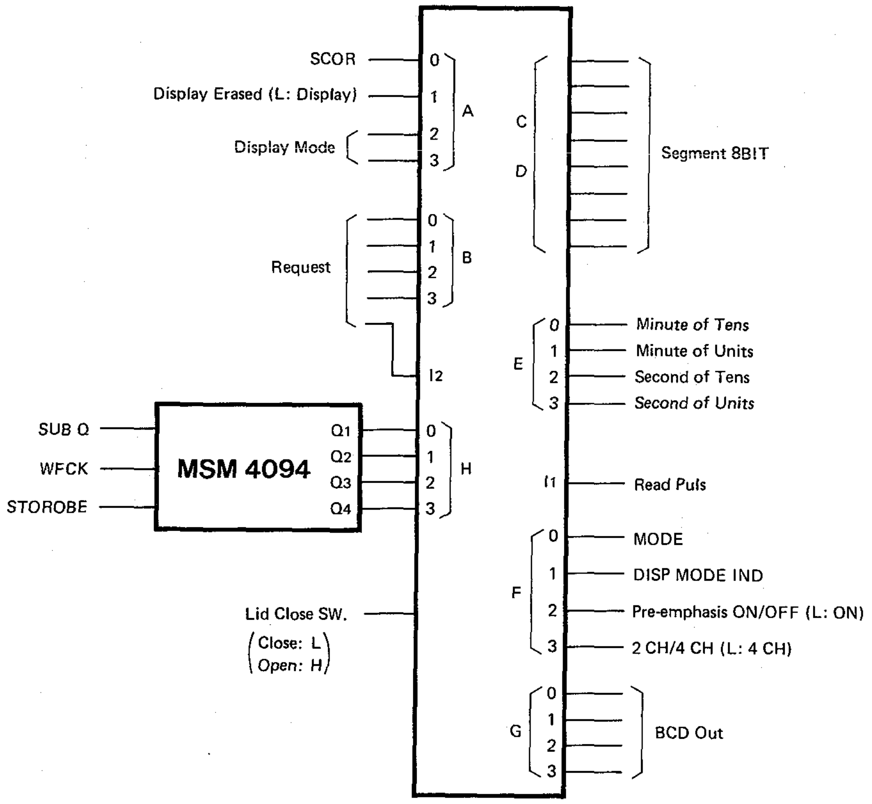
FUNCTION OF "MNR-TIME" MICOM

1. The contents of the display are changed as follows by the signals applied to Ports A2 and A3.

A3 A2	Display	
0 0	TRACK/INDEX No	
0 1	TRACK	TIME
1 0	ABSOLUTE	
1 1	REMAINING	

2. Four bits of the subcode Q data are read at a time from Port H. Data errors are checked by the comparison and conformity with the previous data.
3. I1 is used as a test port. Every time the data are read from Port H, the pulses at "L" level are outputted. When this port is externally set at "L" level, the display of the 7-segment LED becomes the request data which respond to the requests indicated by Ports B and I2.
4. The display is dynamically lit. The second of units, the second, the second of tens, the third, the minute of units, and the fourth, the minute of tens are displayed in the sequential order.

I/O PORTS OF "MNR-TIME" MICOM


SCOR
Display Erased (L: Display)
Display Mode
Request
SUB Q
WFCK
STOROBE
MSM 4094
Q1
Q2
Q3
Q4
Lid Close SW.
Close: L
Open: H
A
B
I2
H
C
D
E
I1
F
G
0
1
2
3
Segment 8BIT
Minute of Tens
Minute of Units
Second of Tens
Second of Units
Read Puls
MODE
DISP MODE IND
Pre-emphasis ON/OFF (L: ON)
2 CH/4 CH (L: 4 CH)
BCD Out

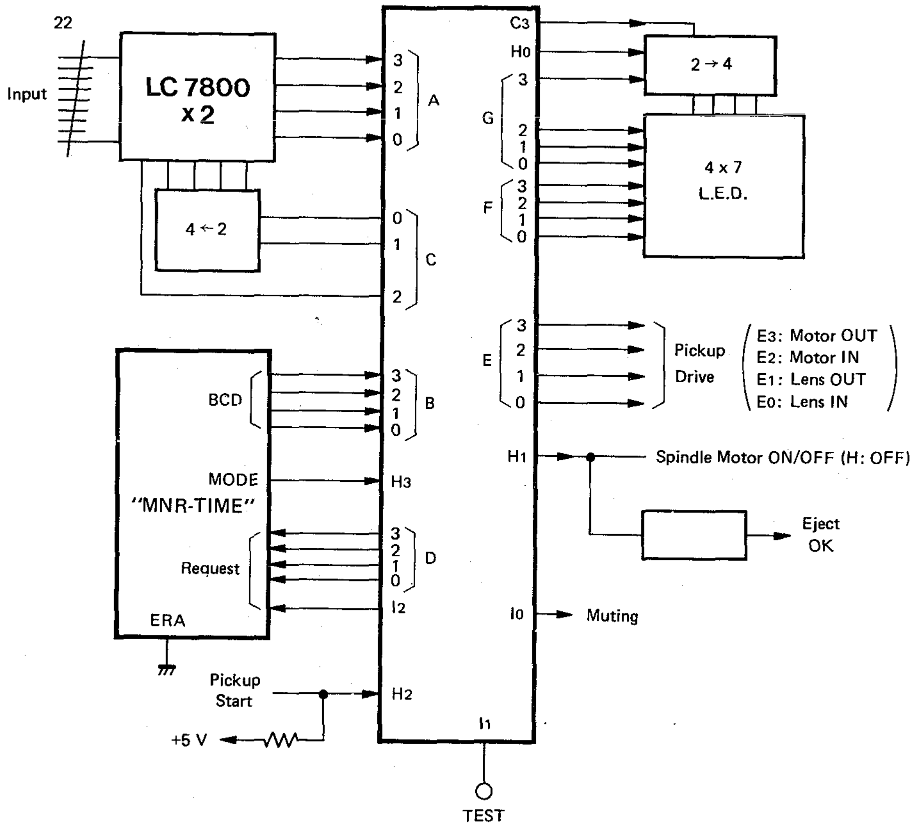
FUNCTION OF "M-SELECT" MICOM

1. This microcomputer responds to the operations of the following nineteen keys.

START	1	8
STOP	2	9
PAUSE	3	10
REPEAT	4	10+
FF	5	CANCEL
FB	6	
SCAN/SKIP	7	

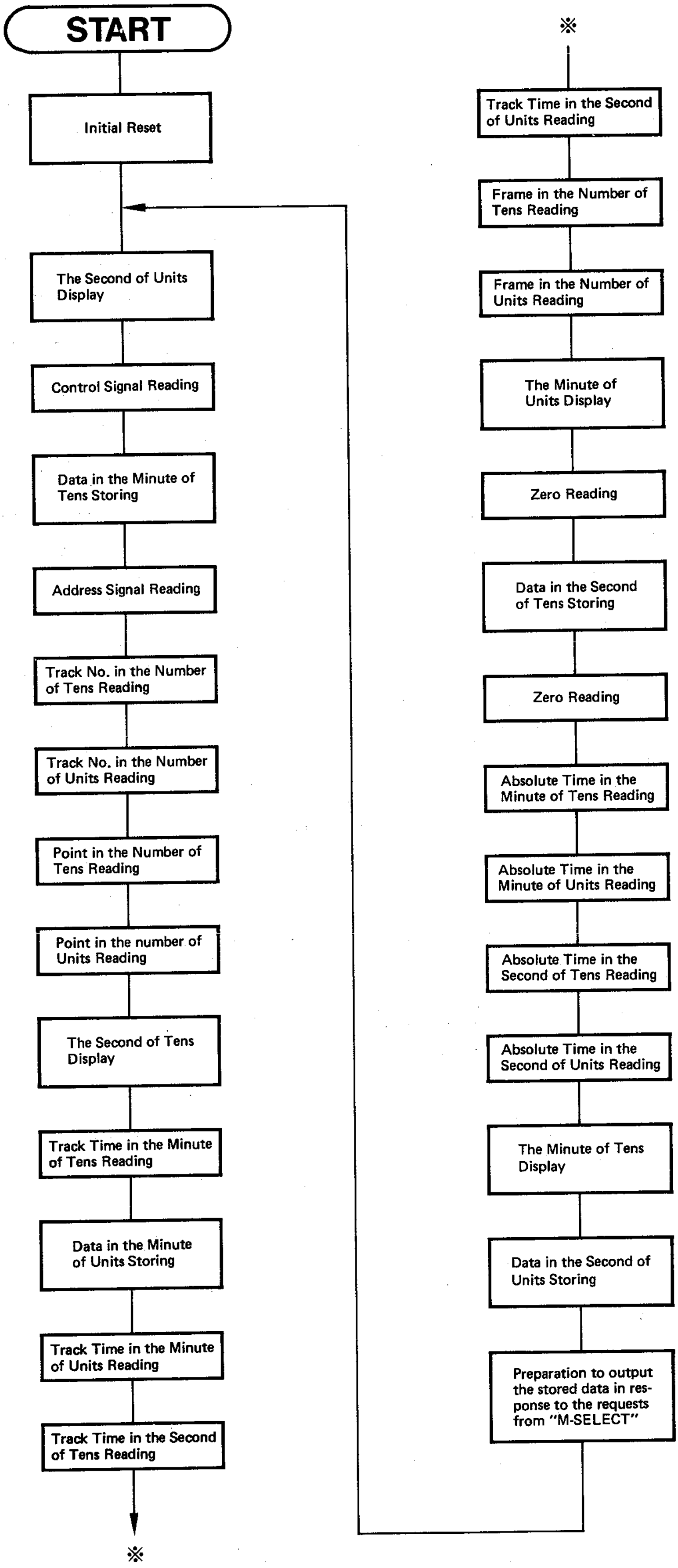
2. The pickup is controlled by the output of Port E to select a desired program.
3. A request such as "TRACK No.", "ABSOLUTE TIME", etc., is transmitted to the microcomputer "MNR-TIME" and received at Ports B and H3.
4. The display is performed by twenty eight LED's. Especially, twenty LED's are used for the display of "TRACK No.", so that the program selection(s) can be easily observed.

I/O PORTS OF "M-SELECT" MICOM

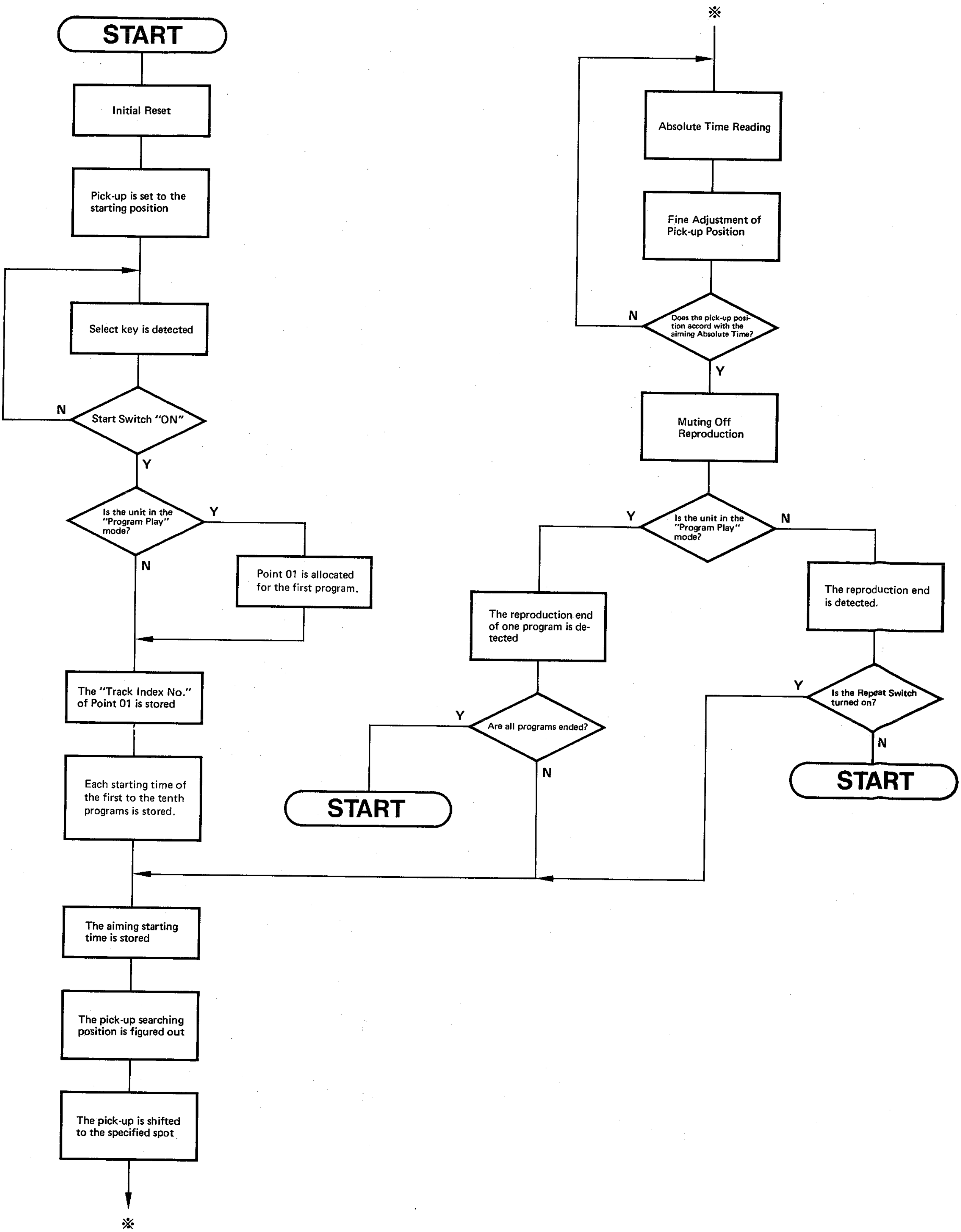


22
Input
LC 7800 x2
4←2
A 3 2 1 0
C 0 1 2
BCD
MODE
"MNR-TIME"
Request
ERA
B 3 2 1 0
H3
D 3 2 1 0
I2
Pickup Start
+5 V
H2
I1
TEST
C3
H0
G 3 2 1 0
F 3 2 1 0
2→4
4 x 7 L.E.D.
E 3 2 1 0
Pickup Drive
E3: Motor OUT
E2: Motor IN
E1: Lens OUT
E0: Lens IN
H1
Spindle Motor ON/OFF (H: OFF)
Eject OK
I0
Muting

"MNR-TIME" MICOM FLOW CHART

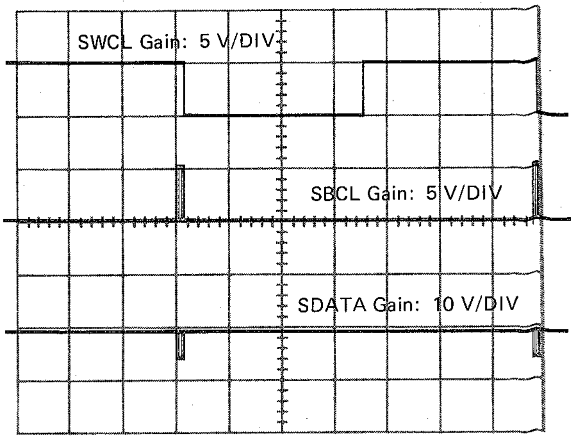

START
Initial Reset
The Second of Units Display
Control Signal Reading
Data in the Minute of Tens Storing
Address Signal Reading
Track No. in the Number of Tens Reading
Track No. in the Number of Units Reading
Point in the Number of Tens Reading
Point in the number of Units Reading
The Second of Tens Display
Track Time in the Minute of Tens Reading
Data in the Minute of Units Storing
Track Time in the Minute of Units Reading
Track Time in the Second of Tens Reading
※
※
Track Time in the Second of Units Reading
Frame in the Number of Tens Reading
Frame in the Number of Units Reading
The Minute of Units Display
Zero Reading
Data in the Second of Tens Storing
Zero Reading
Absolute Time in the Minute of Tens Reading
Absolute Time in the Minute of Units Reading
Absolute Time in the Second of Tens Reading
Absolute Time in the Second of Units Reading
The Minute of Tens Display
Data in the Second of Units Storing
Preparation to output the stored data in response to the requests from "M-SELECT"

"M-SELECT" MICOM FLOW CHART

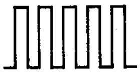

START
Initial Reset
Pick-up is set to the starting position
Select key is detected
N
Start Switch "ON"
Y
Is the unit in the "Program Play" mode?
Y
Point 01 is allocated for the first program.
N
The "Track Index No." of Point 01 is stored
Each starting time of the first to the tenth programs is stored.
The aiming starting time is stored
The pick-up searching position is figured out
The pick-up is shifted to the specified spot
※
※
Absolute Time Reading
Fine Adjustment of Pick-up Position
N
Does the pick-up position accord with the aiming Absolute Time?
Y
Muting Off Reproduction
Y
Is the unit in the "Program Play" mode?
N
The reproduction end of one program is detected
Y
Are all programs ended?
N
START
The reproduction end is detected.
Y
Is the Repeat Switch turned on?
N
START

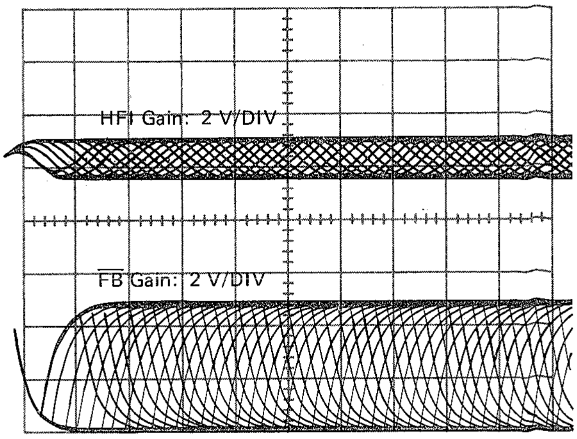
IC's IN DECODER AND WAVE FORMS & FUNCTION

DEMODULATOR (SAA7011)

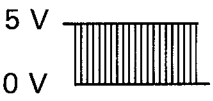


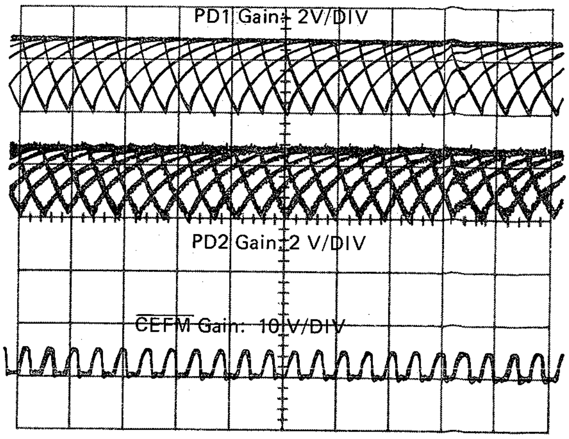
Sweep: 20 μS/DIV

PIN NO.		
1	V_{BB}:	–2.5 V Power terminal
4	SWCL:	Subcode Word Clock 7.35 kHz Duty Cycle 50 %
3	SBCL:	Subcode Bit Clock 2.1609 MHz 
2	SDATA:	Subcode Data
5	P:	Pause Bit "H" among programs Usually "L"
6	HFD:	HFD Input Terminal .... "L" when the connector is disconnected from the Servo P.C.Board or when the unit is in the stop mode. "H" when the unit is in the play mode.
7	HFI:	HF Input Approximately 0.8 V – 1.2 Vp-p
9	$\overline{FB}$:	Inverted FB Terminal The DC potential is approximately 2.5 V without HF input.
8	$\overline{HFI}$:	Approximately 2.5 V DC at play



Sweep: 2 μS/DIV

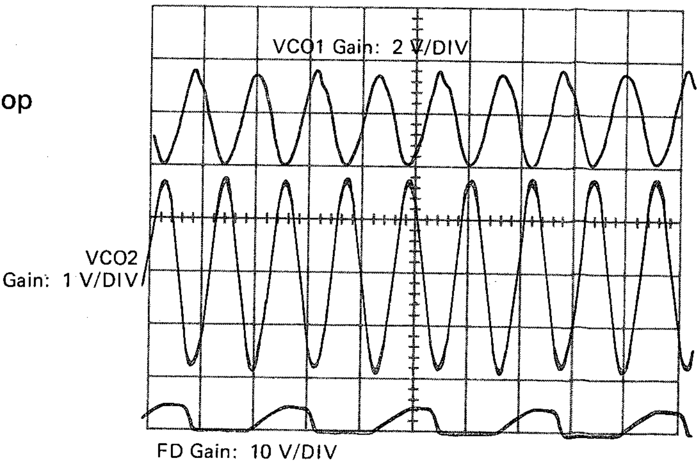
10	FB:	The same wave form at play as seen in the above described $\overline{FB}$
11	DEFM:	As this is a wave form converted into pulses after HF has been sliced, the following is observed. 
12 13	PD2: PD1:	Phase difference signal between reference frequency, which is obtained from the data signal, and internal clock.
22	$\overline{CEFM}$:	Internal Clock 4.3218 MHz Perform the VCO adjustment, observing the wave form as shown in the illustration on the next page.



Sweep: 5 μS/DIV

14	V_{SSD}:	Digital GND Terminal
15	V_{DD2}:	+12 V Power Terminal
16	OA1:	Non-inverted input terminal of L.P.F. AMP which is used to add the detected frequency and phase errors to the variable capacitor of VCO.
17	OA2:	Inverted input terminal of L.P.F. AMP which is used to add the detected frequency and phase errors to the variable capacitor.
18	OA3:	Output terminal of L.P.F. AMP which is used to add the frequency and phase errors to the variable capacitor OA1, OA2, and OA3 have electric potential of 4 V to 6 V DC in the playback mode. The potential of OA3 increases above 10 V in the stop mode and the frequency of $\overline{\text{CEFM}}$ also increases. A small voltage difference in the play mode is caused by the variable capacitor used in the playback mode.

These wave forms can be seen in the stop mode but the frequencies differ.



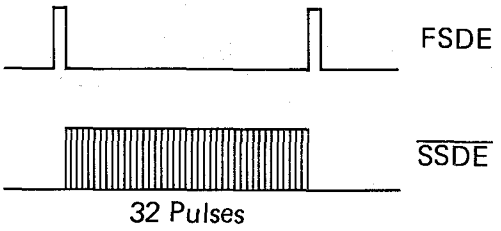
Sweep: 1 μS/DIV

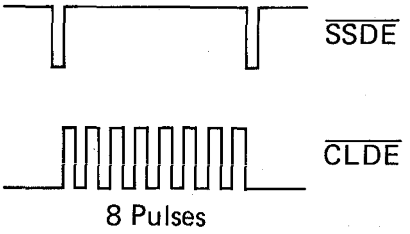
19	V_{SSA}:	Analog GND
20	VCO1:	Input of VCO AMP
21	VCO2:	Output of VCO AMP

23 FD: Output terminal of Frequency Comparator
As this is a TRI-STATE terminal, the same potential as that of PD2 (Pin 12) is kept during the playback operation.
Approximately 12 V in the stop mode
A wave form which looks like noise is observed in the program selection mode.

24 FSDE: Frame Synchronous Signal
7.35 kHz

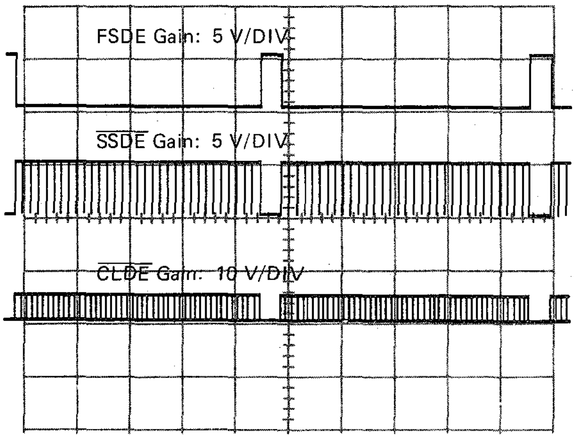
25 $\overline{\text{SSDE}}$: Symbol Synchronous Signal


FSDE
$\overline{\text{SSDE}}$
32 Pulses

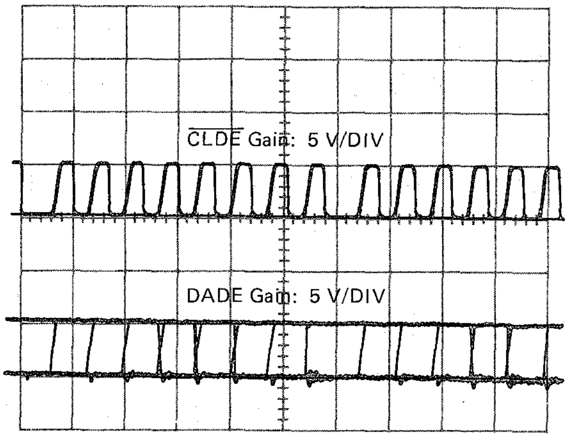

$\overline{\text{SSDE}}$
$\overline{\text{CLDE}}$
8 Pulses

26 $\overline{\text{CLDE}}$: Data Bit Clock
2.1609 MHz

27 DADE: Serial Data
Almost the same signal is observed in the stop mode but the frequency differs.



Sweep: 20 μS/DIV



Sweep: 2 μS/DIV

ERROR CORRECTOR (SAA7020)

1 V_{BB}: –2.5 V Power Terminal

2 FSEC: Frame Synchronous Signal
A pulse with a width of 1.4 µsec. is outputted at intervals of 7.35 kHz.

3 C1FLAG: C1 Error Flag
"H" in error and stop modes
Almost always "L" during the disc play under good condition.

4 MCES: Shows the input condition of the data.
If the data transfer from DEMODULATOR is fast, the duty cycle of the wave observed here is less than 50%, and larger than 50% if the transfer is slow.

5 DADE: Serial Data Input
6 $\overline{\text{CLDE}}$: Data Bit Clock Input
7 $\overline{\text{SSDE}}$: Symbol Synchronous Signal Input
8 FSDE: Frame Synchronous Signal Input
Refer to DEMODULATOR IC.

9 AOER:
|
19 AAER:
Address Bus Terminal

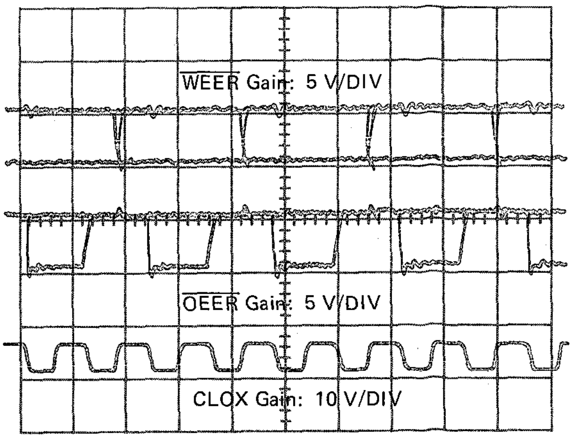
20 V_{SS}: GND Terminal

21 V_{DD2}: +12 V Power Terminal

22 $\overline{\text{TEST}}$: Test Terminal
Normally connected to GND.

23 CLOX: Clock sent from CIM SAA700
Input of 4.2336 MHz

24 $\overline{\text{WEER}}$: Memory Writing OK Signal Output



Sweep: 0.2 µS/DIV

25 $\overline{\text{OEER}}$: Memory Readout OK Signal

28 D0ER:
35 D7ER:
Data transfer in- and output terminals between ERROR CORRECTOR IC (SAA7020) and RAM

36 UNEC: Unreliable Data Flag
Flag which shows unreliable data
Sent to SAA7000 with uncorrectable data
Normally "L"
If there is dust, etc., on the disk, the flag becomes "H".

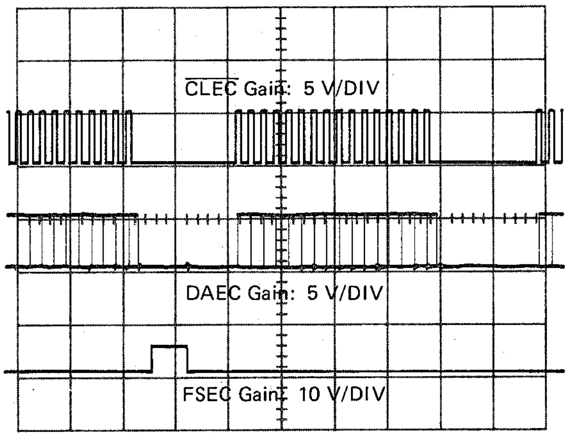
27 $\overline{\text{CLEC}}$: Output Data Clock

37 DAEC: Data Output

38 GAP: Always connected to GND

39 SMSE: Muting Input Terminal
Mute mode in "L" — — — sets UNEC in "H" mode.
"L" in stop and other modes.
Mute mode is released in "H".
"H" in play mode

40 V_{DD1}: 5 V Power Terminal



Sweep: 2 μS/DIV

CONCEALMENT OF ERRORS BY INTERPOLATION AND MUTING (SAA7000)

1 V_{BB}: —25 V Power Terminal

2 FSEC: Frame Synchronous Signal Input
The beginning of Frame shown coincides with the rise of this pulse.

3 $\overline{\text{CLEC}}$: Data Readin Pulse Input

4 DAEC: Terminal for data input transferred from ERROR CORRECTOR

5 UNEC: Error Flag Input

(1–5) Refer to the wave form of ERROR CORRECTOR IC.

6 CLOX: Buffer output for X'TAL output 4.2336 MHz

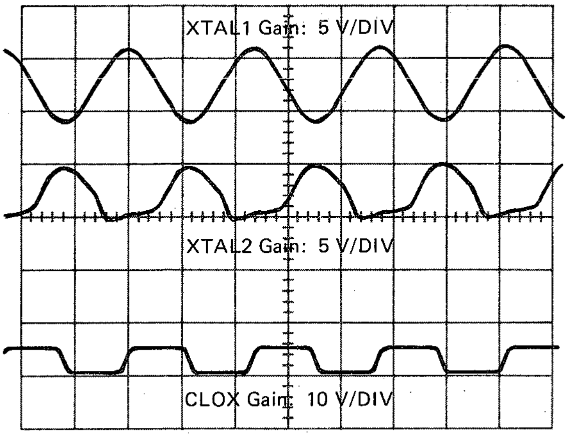
7 XTAL2: X'TAL connecting terminal (output)

8 XTAL1: X'TAL connecting terminal (input)

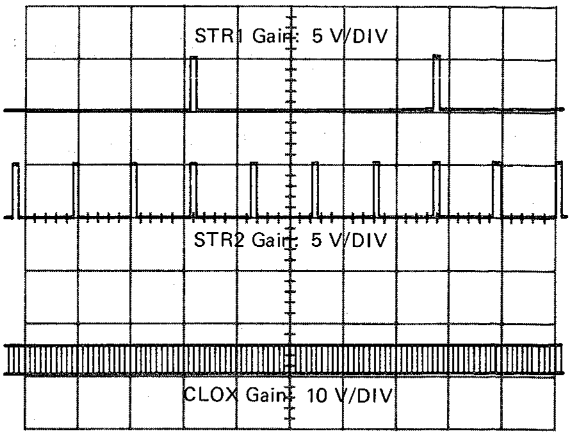
9 V_{SS}: GND Terminal

10 V_{DD2}: +12 V Power Terminal

11 STR2: Strobe Pulse
for D/A CONVERTER: 176 kHz

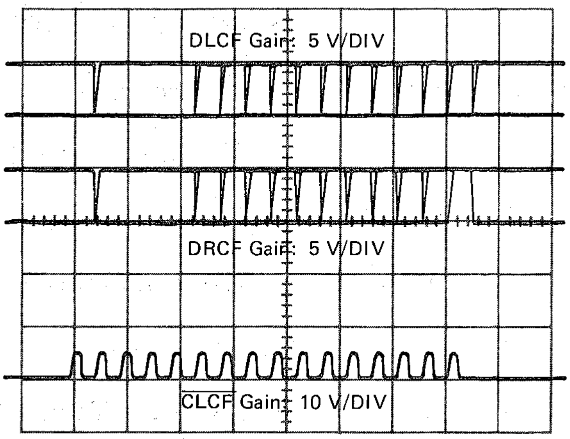


Sweep: 0.1 μS/DIV



Sweep: 5 μS/DIV

12	STR1:	Strobe Pulse for FILTER: 44.1 kHz
13	DLCF:	L CH Data Output Terminal
14	$\overline{\text{CLCF}}$:	CLOCK for data transferred to FILTER with DLCF and DRCF
15	DRCF:	R CH Data Output Terminal
16	14/$\overline{16}$:	Terminal which selects the bit length of $\overline{\text{CLCF}}$ Fixed to the GND potential
17	TEST:	Test Terminal Fixed to the GND potential
18	V_{DD1}:	+5 V Power Terminal



Sweep: 1 μS/DIV

FILTER (SAA7030)

1 V_{BB}: −2.5 V Power Terminal

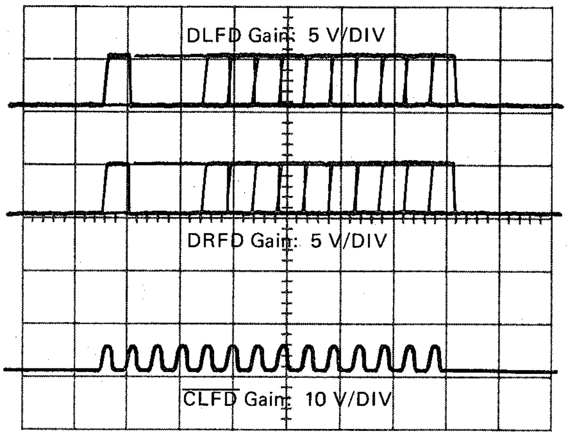
2 OS: DC Offset Terminal
Connected to +5 V Terminal

3 DLFD: L CH Data Output

6 $\overline{\text{CLFD}}$: Clock for data readin transferred to D/A CONVERTER with DLFD and DRFD

7 LAT: 176.4 kHz Strobe
Not used

10 DRFD: R CH Data Output



Sweep: 0.5 μS/DIV

11 OB: Setting Terminal of Output Data Type
Connected to +5 V terminal and set in two's-complement type.

12 V_{SS}: GND Terminal

13 V_{DD2}: +12 V Power Terminal

15 TINR: R CH Test Input Terminal

16 TINL: L CH Test Input Terminal

} Connected to +5 V terminal

17 DRCF: R CH Data Input

18 $\overline{\text{CLCF}}$: Data Clock

19 CLOX: Master Clock

20 DLCF: L CH Data Input

21 STR1: 44.1 kHz Strobe

} Refer to the wave form of SAA7000.

22 $\overline{\text{RT}}$: Reset Test Input Terminal

23 $\overline{\text{TE}}$: Test Enable Input Terminal

} Connected to +5 V Power Terminal.

24 V_{DD1}: +5 V Power Terminal

D/A CONVERTER (TDA1540)

1 DLFD/DRFD: L CH/R CH Data Input Terminal Refer to SAA-7030.

2 LE: Latch Enable Input Terminal Refer to SAA-7000.

3 V_{ref1}: Reference Voltage

4 V_{DD1}: +5 V Power Terminal

5 FC: Frequency Compensating Terminal of OP AMP in CHIP

6 V_{SS}: GND

7 V_{BB}: –5 V Power Terminal

8, 9 OS1, OS2: Oscillator Capacitor Connecting Terminal

10 V_{ref2}: Reference Voltage

11 –17 V: –17 V Power Terminal

12~14 DC1 ~ DC3: Decoupling Terminal of binary current source

15~17 CS1 ~ CS3: Reference Current Source

18~21
23~25 } DC: Decoupling Terminal of binary current source

22 CS: Analog Current Source Output

26 V_{ref3}: Reference Voltage

27 V_{ref4}: Reference Voltage

38 CLOX: Clock Input Refer to SAA7030 $\overline{\text{CLFD}}$.

3	V_{ref1}	–4 V	21	DC7	–2.9 V
8	OS1	–13.5 V	22	CS	0 V
9	OS2	–13.5 V	23	DC8	–2.5 V
10	V_{ref2}	–16.5 V	24	DC9	–2.5 V
12	DC1	–9.2 V	25	DC10	–2.3 V
13	DC2	–6.3 V	26	V_{ref3}	–1.4 V
14	DC3	–6.4 V	27	V_{ref4}	+0.45 V
15	CS1	–8.5 V			
16	CS2	–8.8 V			
17	CS3	–8.8 V			
18	DC4	–4.3 V			
19	DC5	–4.3 V			
20	DC6	–2.9 V			

IC111, 112, 113
(MSM4049, MSM4081, MSM4025)

$\overline{\text{SMSE}}$ P.B.P. is formed using the signals of DAEC, P, and $\overline{\text{Io}}$., so that proper function of program selection system is obtained.

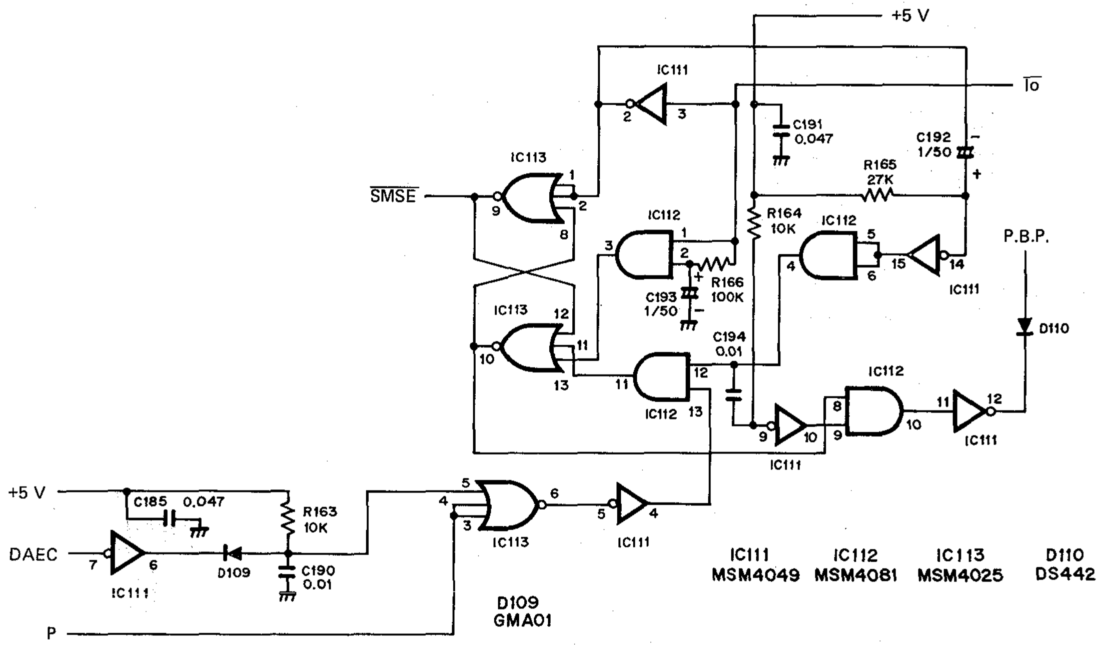
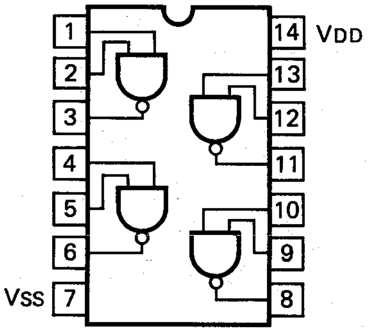

+5 V
IC111
$\overline{\text{Io}}$
C191 0.047
C192 1/50
R165 27K
IC113
$\overline{\text{SMSE}}$
IC112
R164 10K
P.B.P.
R166 100K
C193 1/50
C194 0.01
D110
+5 V
C185 0.047
R163 10K
DAEC
D109
C190 0.01
P
D109 GMA01
IC111 MSM4049
IC112 MSM4081
IC113 MSM4025
D110 DS442

Fig. 17

	IC111 MSM4049			IC112 MSM4081			IC113 MSM4025		
	during stop	during play		during stop	during play		during stop	during play	
1	V_{DD} +5 V			L	H		H	L	
2	H	L	Io	L	H	$\overline{\text{Io}}$	H	L	
3	L	H	$\overline{\text{Io}}$	L	H		L	L	"H" between programs
4	L	L		L	L		L	L	"L" between programs
5	H	H		L	L		L	L	"H" without DAEC
6		$\overline{\text{DAEC}}$	"H" between programs	L	L		H	H	
7	DAEC		"L" between programs	GND			GND		
8	GND			H	L		H	L	
9	H	H		L	L		L	H	$\overline{\text{SMSE}}$
10	L	L		L	L		H	L	
11	L	L	$\overline{\text{PBP}}$	L	L		L	H	
12	H	H	PBP	L	L		L	H	
13	N			L	L		L	H	
14	H	H		V_{DD} +5 V			V_{DD} +5 V		
15	L	L							
16	NC								

IC110 (TC40H000D)

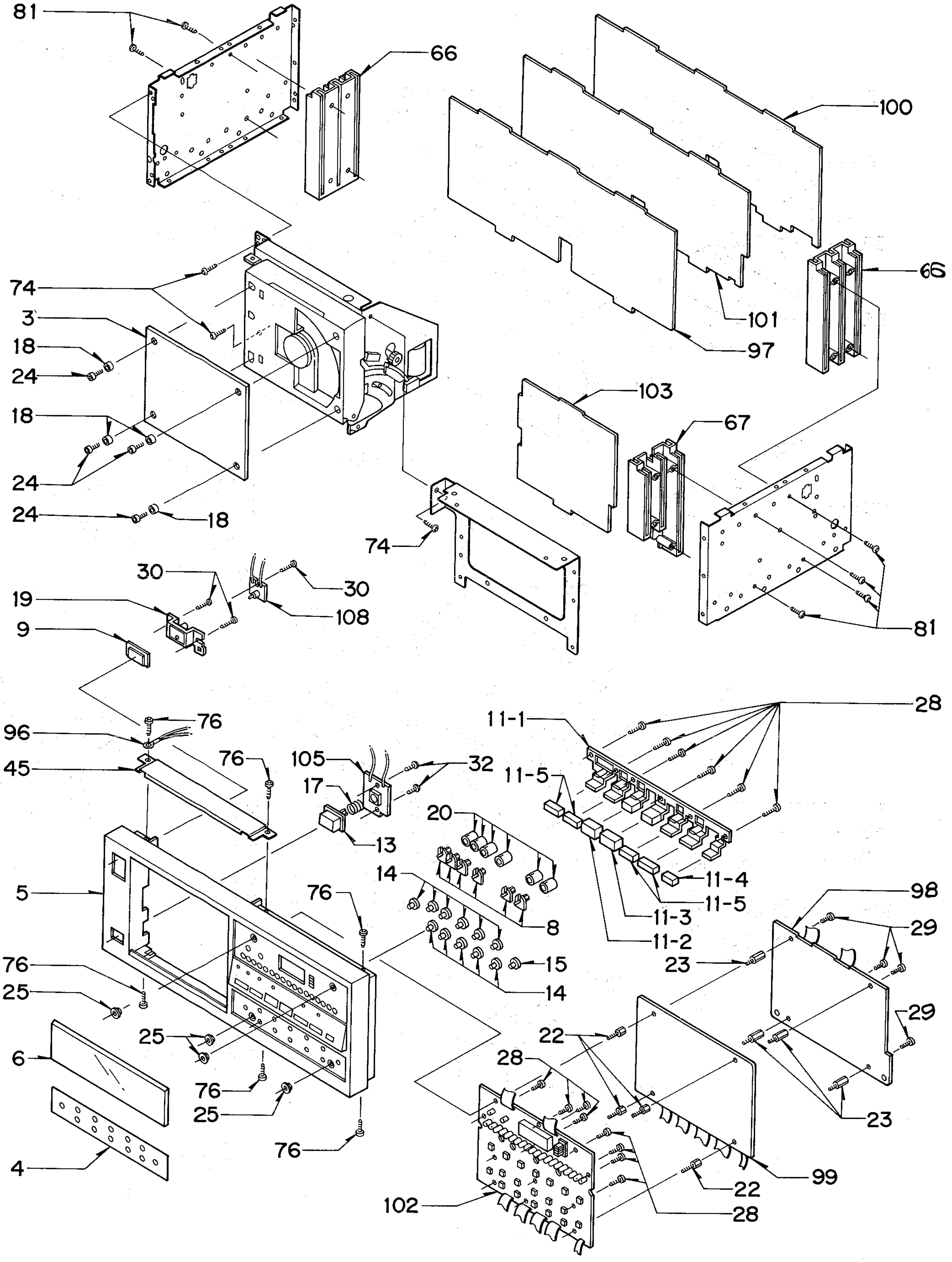


1 C1 → C1′

2 Gating of SDATA is performed by C1′.

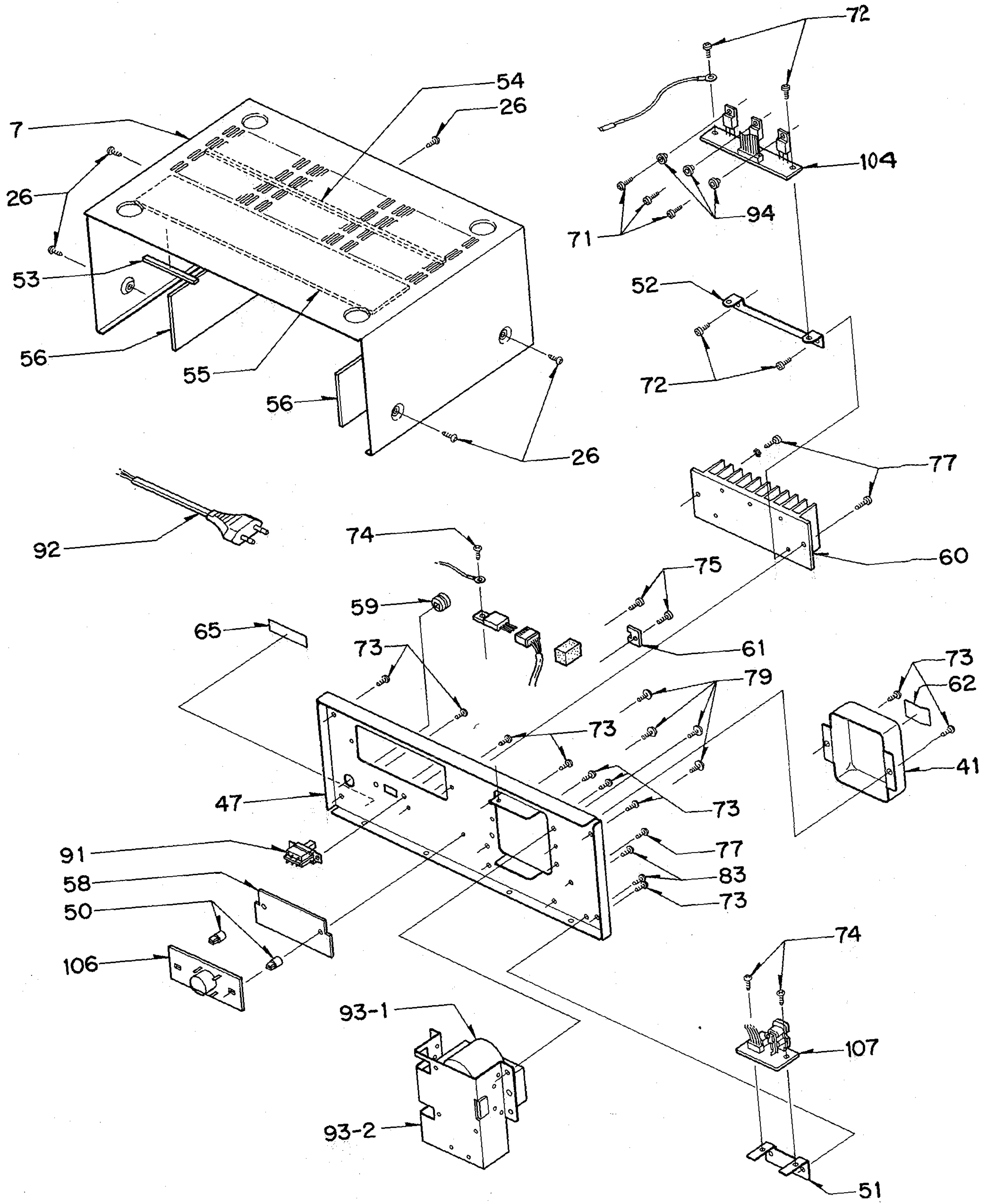
	During Stop	**During Play**	
1	Always “H”	Almost “L”	Input terminal of C1
2	Always “H”	Almost “L”	
3	Always “L”	Almost “H”	$\overline{C1'}$ signal is observed.
4	Always “L”	Almost “H”	
5	Always “L”	Almost “H”	
6	Always “H”	Almost “L”	Output terminal of C1′
7	GND	GND	
8	Always “H”	SDATA	SDATA gated by C1 is observed.
9	Almost “L”	Almost “H”	
10	Almost “L”	$\overline{SDATA}$	Inverted wave form of SDATA is observed.
11	Almost “L”	$\overline{SDATA}$	
12	Almost “H”	SDATA	Input terminal of SDATA
13	Almost “H”	SDATA	
14	5 V	5 V	5 V Power Terminal

CABINET & CHASSIS EXPLODED VIEW (1)



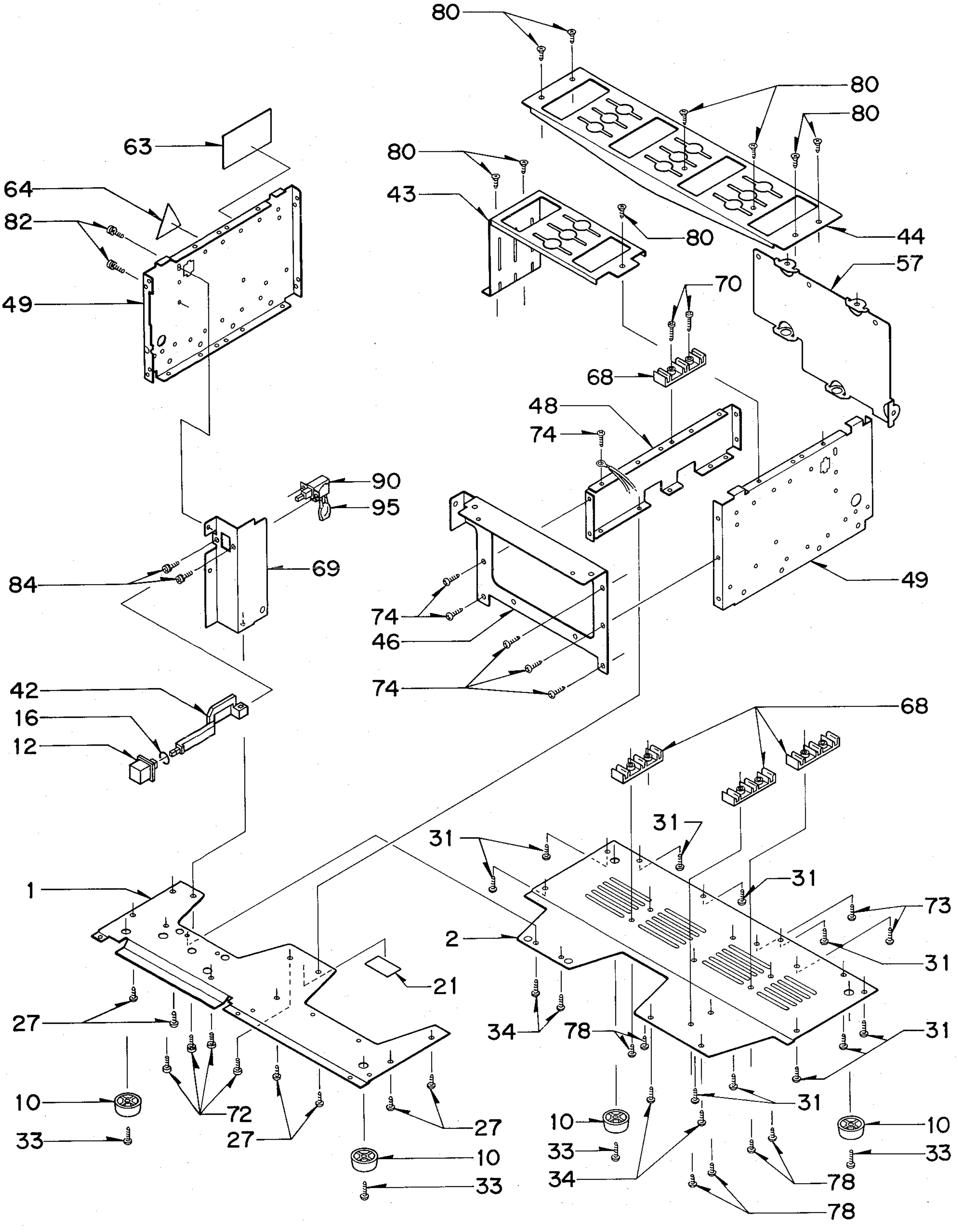
81
66
100
66
74
3
18
24
18
24
24
18
101
97
103
67
74
30
30
19
108
9
81
28
76
96
11-1
45
76
105
32
11-5
17
20
13
14
11-4
5
76
11-5
98
8
11-3
29
11-2
76
15
23
25
14
29
22
25
6
28
23
76
25
99
76
22
4
102
28

CABINET & CHASSIS EXPLODED VIEW (2)



72
54
26
7
104
26
94
71
53
52
56
72
55
56
26
77
92
74
60
75
59
65
61
73
73
79
62
73
41
47
73
91
77
58
83
50
73
106
74
93-1
107
93-2
51

CABINET & CHASSIS EXPLODED VIEW (3)


80
80
80
80
63
64
82
49
43
80
44
57
70
68
48
74
90
95
84
69
49
74
46
74
42
16
12
68
31
31
31
1
73
2
31
21
27
34
78
31
72
10
10
31
10
33
27
27
33
33
10
33
34
78
78

CABINET & CHASSIS PARTS LIST

PACKAGE PARTS LIST

Ref. No.	Part No.	Description	Q'ty
	3 9415 10300	Bag Polyethylene	1
	131 6 1169 12701	Box Corrugate EXP	1
	131 6 2119 02131	Bag Polyethylene EXP	1
	131 6 3009 34930	Pad (Left)	1
	131 6 3009 34940	Pad (Right)	1
	131 6 3069 16350	Patching Sheet	1
	131 6 4559 10900	Manufacturing No	2

ACCESSORIES PARTS LIST

Ref. No.	Part No.	Description	Q'ty
	4 2369 73920	Plug Cord	1
	4 2369 74030	Plug Cord	1
	131 2 7905 00200	Cleaner Disc	1
	131 6 2719 10801	Bag Fan	1
	131 6 4159 39200	Notes	1
	131 6 4519 15700	Guarantee Certificate	1
	131 6 4559 10900	Manufacturing No	1
	142 6 4119 31776	Explanatory Booklet	1

CABINET PARTS LIST

Ref. No.	Part No.	Description	Q'ty
1	131 2 1105 29800	Plate Bottom	1
2	131 2 1105 29900	Plate Bottom Cover	1
3	131 2 1107 26900	Lid	1
4	131 0 1016 43400	Plate Decorate Assy	1
5	131 2 1203 60301	Panel Control	1
6	131 2 1205 27900	Decorate Plate Dial	1
7	131 2 1410 30502	Cover	1
8	131 2 1503 15800	Decorate Sign	6
9	131 2 1503 15900	Decorate Sign	1
10	131 2 1801 14100	Leg	4
11	131 0 1001 62700	Knob Assy	1
11-1	131 2 1601 89100	Knob	1
11-2	131 2 1604 47900	Decorate Knob (Play)	1
11-3	131 2 1604 47901	Decorate Knob (Stop)	1
11-4	131 2 1604 48000	Decorate Knob	1
11-5	131 2 1604 48100	Decorate Knob	4
12	131 2 1601 88500	Knob (Power)	1
13	131 2 1601 88600	Knob (Open/Close)	1
14	131 2 1601 89200	Knob	11
15	131 2 1601 89201	Knob	1
16	131 2 5101 23400	Spring	1
17	131 2 5101 36200	Spring (Open/Close)	1
18	131 2 6113 50200	Shelter	4
19	131 2 6113 50300	Shelter	1
20	131 2 6113 50400	Shelter Decorate Sign	6
21	131 6 4159 39300	Notes	1
22	134 2 4106 29600	Shaft	4
23	134 2 4106 29700	Shaft	4
24	134 2 4201 14900	Screw	4
25	141 2 4179 05500	Frange Nut	4
26	143 3 1703 00618	Screw, Bind Hd. Tapping-B +M3.0x6	5
27	143 3 1903 00611	Screw, Brazier Hd. Tapping-B +M3.0x6	6
28	143 3 1302 60811	Screw, Pan Hd. Tapping-B +M2.6x8	14
29	101 3 1303 00611	Screw, Pan Hd. +M3.0x6	4
30	143 3 1302 00611	Screw, Pan Hd. Tapping-B +M2.0x6	3
31	143 3 1903 00618	Screw, Brazier Hd. Tapping-B +M3.0x6	10
32	143 3 1903 00811	Screw, Brazier Hd. Tapping-B +M3.0x8	2
33	143 3 1903 01011	Screw, Brazier Hd. Tapping-B +M3.0x10	4
34	143 3 1903 00618	Screw, Brazier Hd. Tapping-B +M3.0x6	4

CHASSIS PARTS LIST

Ref. No.	Part No.	Description	Q'ty
41	131 2 1410 30600	Cover	1
42	131 2 1601 88400	Knob	1
43	131 2 3101 94600	Metal Mount Bridge	1
44	131 2 3101 94700	Metal Mount Bridge	1
45	131 2 3201 12600	Angle Reinf	1
46	131 2 3301 30500	Chassis Front	1
47	131 2 3306 38102	Panel Rear	1
48	131 2 3308 13800	Chassis Sub	1
49	131 2 3308 13900	Chassis Sub	2
50	131 2 3614 22900	Mount P.C.B.	2
51	131 2 3614 27100	Mount P.C.B.	1
52	131 2 3614 27200	Mount P.C.B.	1
53	131 2 5205 31600	Cushion	1
54	131 2 5205 31200	Cushion	1
55	131 2 5205 31300	Damper (L)	1
56	131 2 5205 31400	Damper (S)	2
57	131 2 6101 30700	Plate Shield	1
58	131 2 6107 30400	Plate Sever	1
59	131 2 6111 14200	Bushing (4N-4)	1
60	131 2 6201 22606	Plate Heat Sink	1
61	131 2 7104 00500	Plate Pad Switch	1
62	131 6 4159 39600	Notes (Laser)	1
63	131 6 4159 40200	Notes (Laser)	1
64	131 6 4159 40300	Notes (Laser)	1
65	131 6 4559 10900	Manufacturing No	1
66	134 2 2106 12900	Holder P.C.B. (R)	2
67	134 2 2106 13000	Holder P.C.B. (L)	1
68	134 2 2106 13100	Holder P.C.B. (Bottom)	4
69	134 2 2604 11500	Angle Switch	1
70	143 3 1902 61011	Screw, Brazier Hd. Tapping-B +M2.6x10	2
71	101 3 1302 60611	Screw, Pan Hd. +M2.6x6	3
72	101 3 1303 00611	Screw, Pan Hd. +M3.0x6	8
73	143 3 1903 00618	Screw, Brazier Hd. Tapping-B +M3.0x6	12
74	143 3 1903 00611	Screw, Brazier Hd. Tapping-B +M3.0x6	12
75	101 3 1303 00618	Screw, Pan Hd. +M3.0x6	2
76	143 3 1303 00818	Screw, Pan Hd. Tapping-B +M3.0x8	6
77	143 3 1903 00818	Screw, Brazier Hd. Tapping-B +M3.0x8	3
78	143 3 1903 00811	Screw, Brazier Hd. Tapping-B +M3.0x8	6
79	143 3 1704 00818	Screw, Bind Hd. Tapping-B +M4.0x8	4
80	143 3 1203 00618	Screw, Flat Hd. Tapping-B +M3.0x6	9
81	143 3 1203 00818	Screw, Flat Hd. Tapping-B +M3.0x8	6
82	101 3 1203 00618	Screw, Flat Hd. +M3.0x6	2
83	143 3 1903 01218	Screw +M3.0x12	2
84	131 3 1303 00611	Screw +M3.0x6	2

ELECTRICAL PARTS LIST

Ref. No.	Part No.	Description	Q'ty
90	⚠ 4 2312 05030	Switch Push Power	1
91	⚠ 4 2312 01020	Switch Slide	1
92	⚠ 4 2432 00140	Line Cord	1
93	⚠ 4 2512 22120	Power Trans Assy	1
93-1	4 2512 19920	Power Trans	1
93-2	131 2 3617 19100	Metal Mount Trans	1
94	201 2 5020 01401	Bush-3P	3
95	⚠ 4 2239 70970	Capacitor 0.01μF 400V	1
96	4 2372 01030	Terminal Lug	1
97	141 0 1939 00210	Servo P.C.B. Assy	1
98	141 0 1939 00220	Display Micom P.C.B. Assy	1
99	141 0 1939 00230	Program Micom P.C.B. Assy	1
100	141 0 1939 00241	Power Supply & Interface P.C.B. Assy	1

CABINET & CHASSIS PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
101	141 0 1939 00250	Decoder P.C.B. Assy	1
102	141 0 1939 00260	Keyboard Switch P.C.B. Assy	1
103	141 0 1939 00270	Open/Close P.C.B. Assy	1
104	141 0 1939 00290	Power Supply P.C.B. Assy	1
105	141 0 1939 00300	Push Switch P.C.B. Assy	1
106	141 0 1939 01520	Filter P.C.B. Assy	1
107	141 0 1939 00321	Output P.C.B. Assy	1
108	141 0 1939 01200	Power Indicator P.C.B. Assy	1

NOTES:

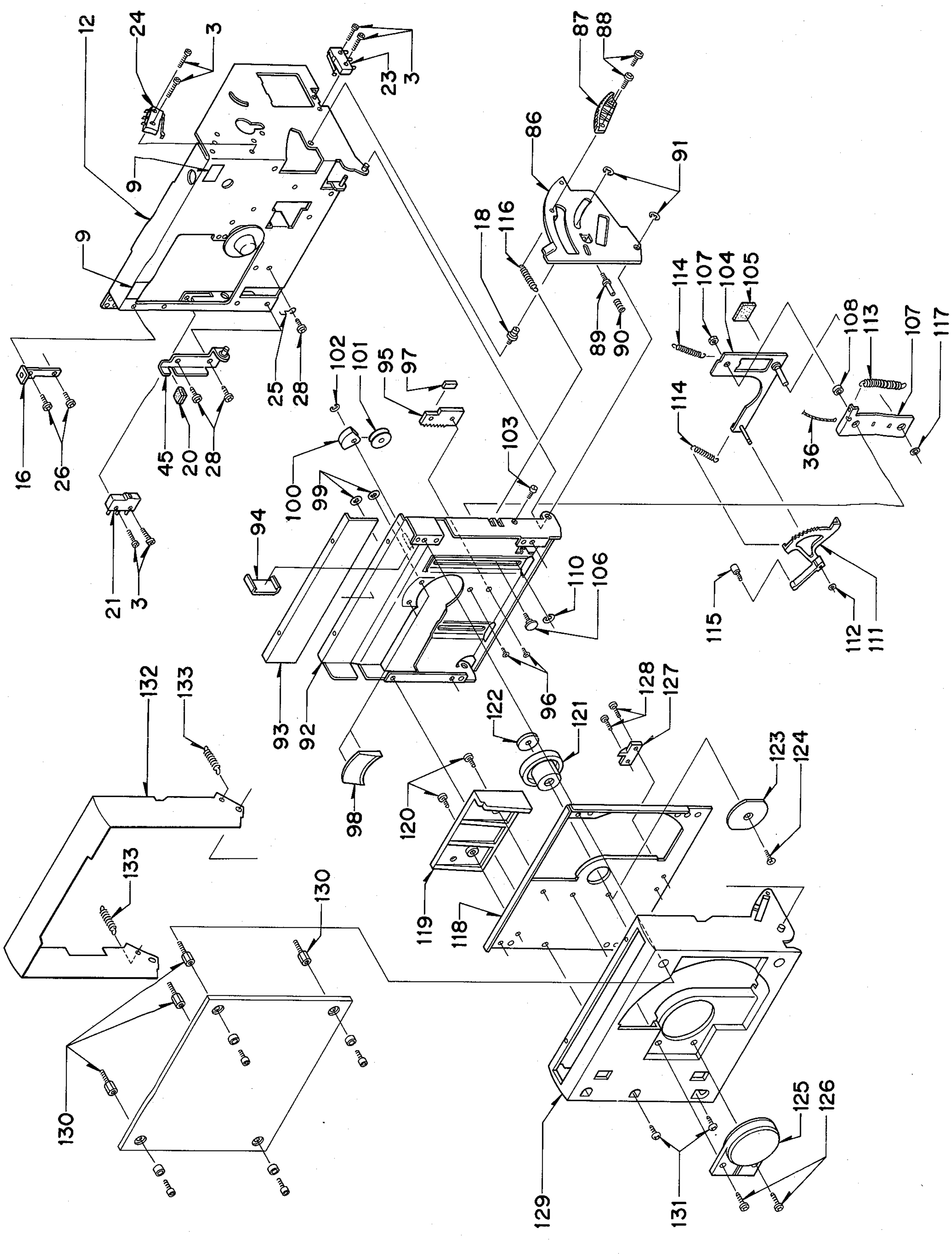
1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.

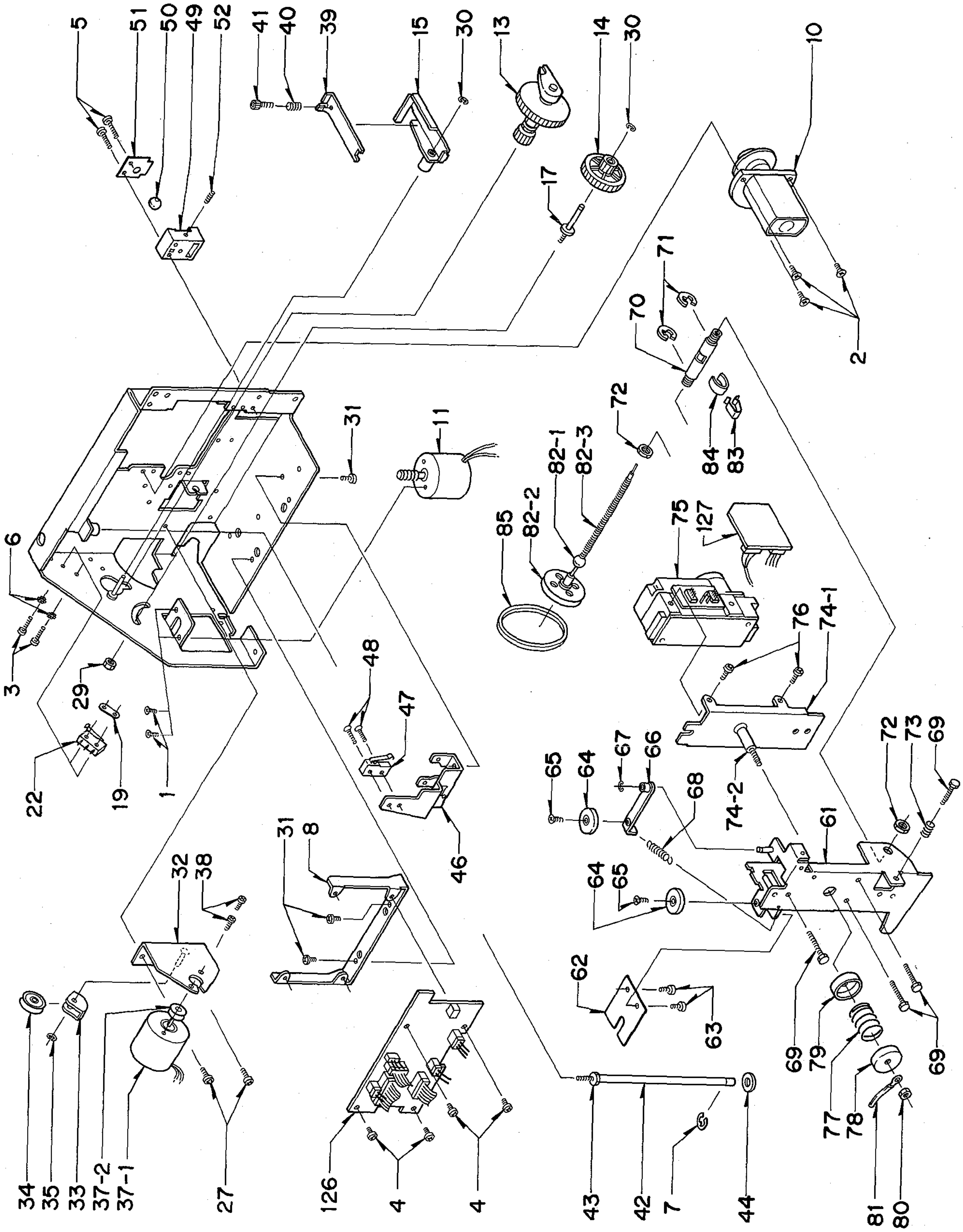
Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

MECHANISM EXPLODED VIEW (1)



12
24
3
23
3
87
88
86
91
9
9
18
116
114
107
104
105
108
113
107
117
16
26
45
20
28
25
28
102
101
95
97
89
90
114
36
103
100
99
94
21
3
110
106
115
112
111
132
133
93
92
96
122
121
128
127
123
124
98
120
133
130
119
118
130
129
131
125
126

MECHANISM EXPLODED VIEW (2)


5
51
50
49
52
41
40
39
15
30
13
14
30
10
17
71
70
2
6
3
31
11
72
82-1
82-3
82-2
85
84
83
75
127
76
74-1
29
22
19
1
48
47
46
65
64
67
66
68
74-2
61
72
73
69
31
8
32
38
64
65
62
63
69
79
69
34
35
33
37-2
37-1
27
126
4
4
43
42
7
44
77
78
81
80

MECHANISM PARTS LIST

CHASSIS MECHANISM PARTS LIST

Ref. No.	Part No.	Description		Q'ty
1	101 3 1202 00411	Screw, Flat Hd.	+M2.0x4	2
2	101 3 1203 00811	Screw, Flat Hd.	+M3.0x8	3
3	101 3 1302 31011	Screw, Pan Hd.	+M2.3x10	8
4	101 3 1303 00411	Screw, Pan Hd.	+M3.0x4	4
5	103 3 1303 51411	Screw, Pan Hd. Tapping-2	+M3.5x14	2
6	110 3 3202 30011	Ext. Star Washer	M2.3	2
7	112 3 1305 00011	E Ring	M5.0	1
8	131 2 3101 93800	Metal Mount		1
9	131 2 5208 00400	Sheet Slide		2
10	134 0 5011 03100	Motor Assy (Spindle)		1
11	134 0 5011 03200	Motor Assy (Lid)		1
12	134 0 6029 11100	Unit Shaft Assy		1
13	134 0 6030 11800	Gear Cam Assy		1
14	134 0 6030 11900	Gear Assy		1
15	134 0 6038 00600	Arm Assy (Cam)		1
16	134 2 2403 25300	Angle Mount		1
17	134 2 4106 28800	Shaft Gear		1
18	134 2 4106 29000	Shaft Guide		1
19	134 2 4202 13700	Nut Plate		1
20	134 2 5205 12000	Cushion		1
21	4 2312 06100	Micro Switch (Pick-up End)		1
22	4 2312 06090	Micro Switch (Open)		1
23	4 2312 06090	Micro Switch (Close)		1
24	4 2312 06090	Micro Switch (Laser)		1
25	131 2 3608 16100	Cramp Wire		1
26	103 3 1703 00511	Screw, Bind Hd. Tapping-2	+M3.0x5	2
27	131 2 4201 13505	Screw		2
28	103 3 1703 00511	Screw, Bind Hd. Tapping-2	+M3.0x5	3
29	106 3 1103 00011	Hex. Nut-1	M3.0	1
30	112 3 1302 00011	E Ring	M2.0	2
31	131 2 4201 13505	Screw		3
32	134 0 5009 10800	Plate Motor Assy		1
33	134 2 4121 13200	Guide Rope		1
34	131 2 4107 10300	Pulley		1
35	112 3 1302 00011	E Ring	M2.0	1
36	131 2 4112 10500	Rope Wire		1
37	134 0 5011 03300	Motor Assy (Transit)		1
37-1	4 5272 00170	Comutate Motor Magnet		1
37-2	134 2 6401 14300	Pulley B		1
38	101 3 1302 00311	Screw, Pan Hd.	+M2.0x3	2
39	134 2 4123 22300	Arm Adjust		1
40	131 2 5801 00220	Azimuth Spring		1
41	131 2 4201 21604	Screw		1
42	134 2 2104 12600	Screw Transit		1
43	134 2 4202 13300	Nut		1
44	131 2 4203 23400	Washer		1
45	134 0 6029 10900	Angle Shaft Assy		1
46	134 2 2403 25600	Angle Mount		1
47	4 2312 06090	Micro Switch (Pick-up Start)		1
48	101 3 1202 01011	Screw, Flat Hd.	+M2.0x10	2
49	134 2 2106 12800	Holder		1
50	131 2 4114 12900	Support Shaft		1
51	134 2 5103 11400	Spring Plate		1
52	134 2 4201 29900	Screw		1
53	141 2 4539 19802	Washer		1

INNER MECHANISM PARTS LIST

Ref. No.	Part No.	Description		Q'ty
61	134 0 6029 10800	Angle Transit Assy		1
62	134 2 5103 11300	Spring Plate		1
63	131 2 4201 13505	Screw		2
64	131 0 2017 00300	Roller Assy		2
65	101 3 1202 60611	Screw, Flat Hd.	+M2.6x6	2
66	134 0 6038 00500	Arm Assy (Roller)		1
67	112 3 1302 00011	E Ring	M2.0	1
68	134 2 5101 35400	Spring		1
69	125 3 1303 01411	B-C M3.0x14		3
70	134 0 6049 00100	Drive Screw Assy		1
71	112 3 1308 00011	E Ring	M8.0	2
72	131 2 4202 12700	Nut		2
73	131 2 5801 00220	Azimuth Spring		1
74	134 0 6029 11200	Angle Mount Assy		1
74-1	131 2 3101 93700	Metal Mount		1
74-2	134 2 4106 29400	Shaft		1
75	134 0 4009 03400	Pick-up Assy		1
76	131 3 1303 00611	Screw, Pan Hd. C SW	+M3.0x6	2
77	134 2 5101 35300	Spring Hold		1
78	134 2 4213 11000	Washer Bowl		1
79	134 2 4213 11001	Washer Bowl		1
80	106 3 1104 00011	Hex. Nut-1	M4.0	1
81	141 2 4729 08800	Lug		1
82	131 0 3021 00400	Shaft Drive Assy		1
82-1	131 2 4114 12900	Support Shaft		1
82-2	134 0 5003 10200	Pulley Assy		1
82-3	134 2 4201 14300	Screw Drive Shaft		1
83	134 2 5103 11500	Spring Plate		1
84	131 2 4208 44500	Spacer		1
85	134 2 6302 11700	Belt Transit		1
86	134 0 5005 00200	Plate Lid Assy		1
87	134 2 4110 11600	Gear Arm		1
88	131 2 4201 15000	Screw		2
89	134 2 4201 14200	Screw Spring Hold		1
90	131 2 5801 00220	Azimuth Spring		1
91	112 3 1303 00011	E Ring	M3.0	2
92	134 0 6029 11000	Case Shaft Assy		1
93	131 2 5202 10700	Rubber Cushion Disk		1
94	134 2 4121 13600	Guide		1
95	134 2 4110 12200	Gear (Rack)		1
96	101 3 1202 00318	Screw, Flat Hd.	+M2.0x3	2
97	134 2 6307 00600	Magnet Bias		1
98	134 2 4121 13500	Guide Eject		1
99	131 2 4220 10502	Ring Snap		2
100	134 2 4121 13200	Guide Rope		1
101	131 2 4107 10300	Pulley		1
102	112 3 1302 00011	E Ring	M2.0	1
103	134 2 4201 14400	Screw Guide		1
104	134 0 6026 12800	Angle Elevate Assy		1
105	141 2 4469 17201	Cushion		1
106	134 2 4201 14500	Screw		1
107	106 3 1103 00011	Hex. Nut-1	M3.0	1
108	134 2 4208 17100	Spacer		1
109	134 0 5012 00500	Sensor Disk Switch Assy		1
110	112 3 1303 00018	E Ring	M3.0	1
111	134 2 4110 12100	Gear Arm Elevate		1
112	141 2 4539 15700	Washer		1
113	134 2 5101 35200	Spring Rope		1
114	141 2 8549 23500	Spring Brake		2
115	141 2 4219 32300	Screw		1
116	134 2 5101 36100	Spring		1
117	141 2 4539 34600	Washer		1
118	131 2 3101 93900	Metal Mount Bridge		1
119	134 2 4121 13300	Guide Disk		1
120	103 3 1703 00618	Screw, Bind Hd. Tapping-2	+M3.0x6	2
121	134 2 4125 12000	Stopper Disk		1
122	134 0 5012 00700	Magnet Assy (Spindle)		1
123	134 2 4125 11900	Stopper		1
124	131 2 4201 13700	Screw (Taptite) 3x6 Z1		1

MECHANISM PARTS LIST (Continued)

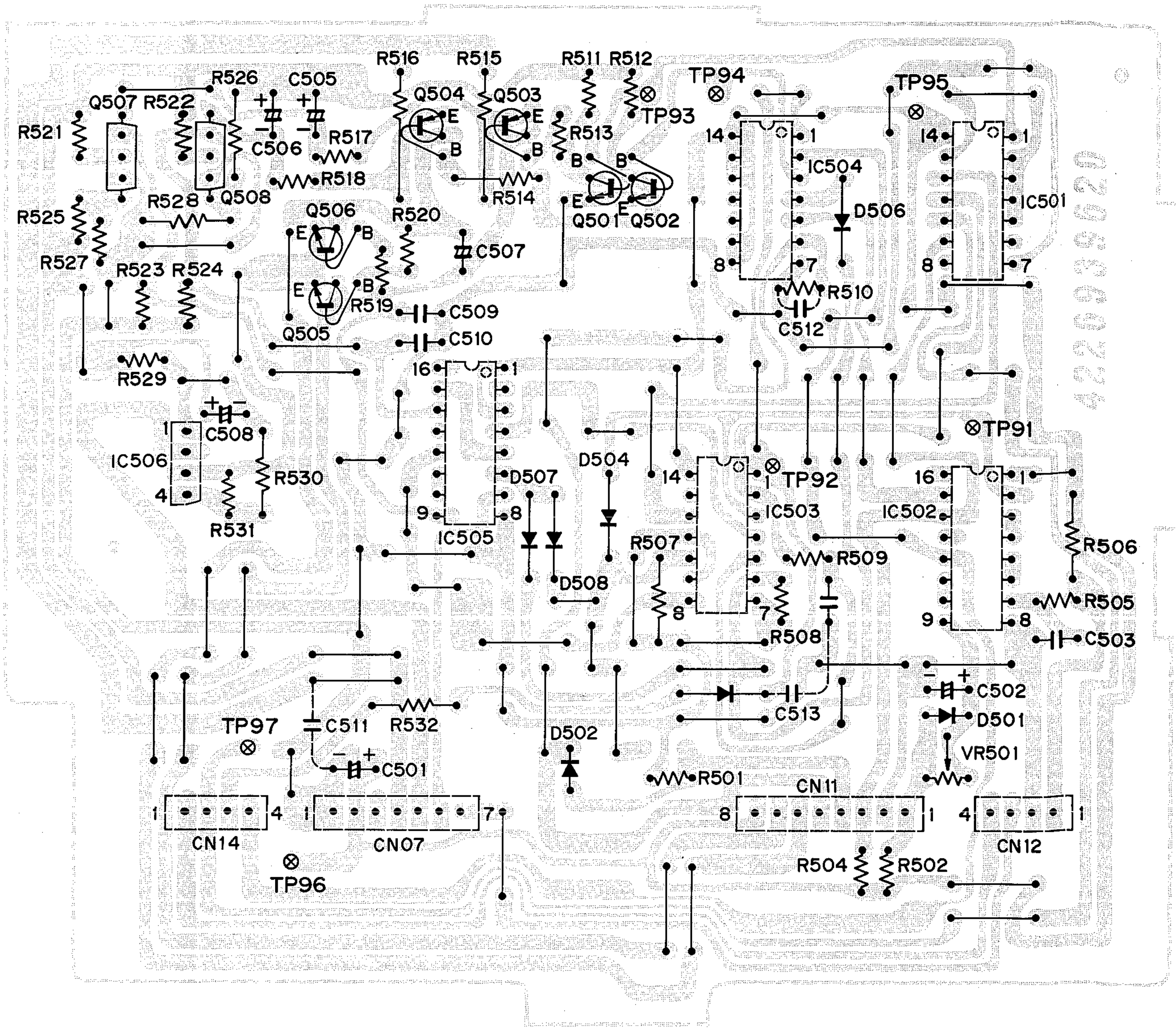
Ref. No.	Part No.	Description		Q'ty
125	131 2 1410 30300	Cover Spindle		1
126	143 3 1903 00811	Screw, Brazier Hd. Tapping-B	+M3.0x8	2
127	134 2 4121 13100	Guide		1
128	101 3 1302 00411	Screw, Pan Hd.	+M2.0x4	2
129	134 2 1404 13100	Housing Disk		1
130	134 2 4106 30000	Shaft		4
131	143 3 1903 00618	Screw, Brazier Hd. Tapping-B	+M3.0x6	2
132	134 2 4108 32300	Plate Shutter		1
133	134 2 5101 35900	Spring Shutter		2
134	141 0 1939 00280	Laser P.C.B. Assy		1
135	141 0 1939 00330	Pick-up P.C.B. Assy		1

NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

OPEN/CLOSE P.C.BOARD

(BOTTOM VIEW)


R516
R515
R511
R512
R526
C505
Q507
R522
R521
C506
R517
Q504
Q503
R513
TP93
TP94
TP95
R518
R514
Q501
Q502
R528
Q508
R525
R527
R523
R524
Q506
R520
C507
R519
Q505
C509
C510
R529
C508
IC506
R530
R531
IC505
D507
D504
D508
IC504
D506
R510
C512
IC501
TP91
TP92
IC503
IC502
R507
R509
R508
R506
R505
C503
C502
D501
VR501
C513
R501
CN11
D502
TP97
C511
R532
C501
CN14
CN07
TP96
R504
R502
CN12
4220936620

IC PIN NUMBERS DC VOLTAGES (STOP MODE)

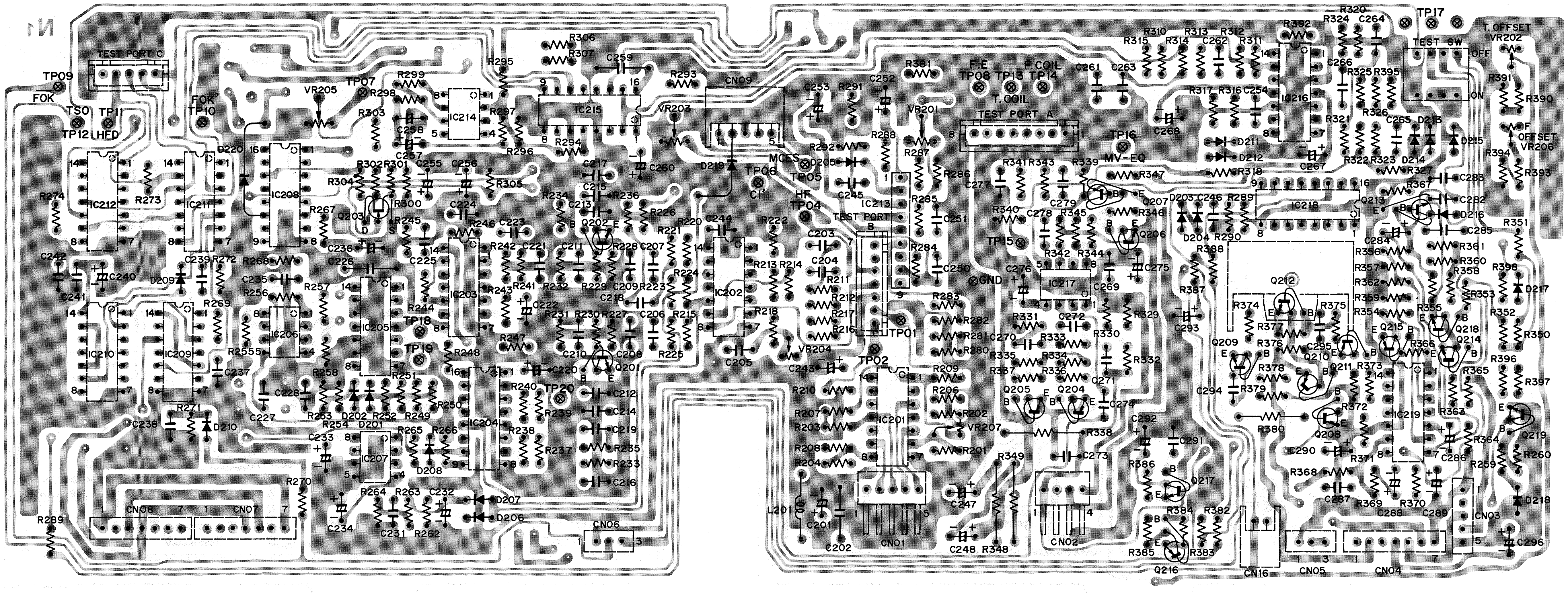
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC501	MSM4012RS	0V	5.0V	5.0V	5.0V	5.0V	–	0V	–	5.0V	5.0V	0V	5.0V	5.0V	5.0V		
IC502	MSM4049RS	5.0V	0V	5.0V	5.0V	0V	0V	5.0V	0V	0V	5.5V	5.5V	0V	–	5.5V	0V	–
IC503	MSM4013RS	5.0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	0V	5.0V	–	5.0V		
IC504	MSM4081	5.0V	0V	0V	0V	0V	0V	–	–	–	–	–	–	–	5.0V		
IC505	MSM4049RS	5.0V	–	–	0V	5.0V	0V	5.0V	0V	0V	5.0V	5.0V	0V	–	0V	5.0V	–
IC506	LA5512	12.1V	0V	8.1V	10.8V												

TRANSISTOR DC VOLTAGES (STOP MODE)

SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E
Q501,502	2SC3400	0V	12.3V	0V	Q507,508	2SA798	11.2V	0V	11.8V
Q503,504	2SB764	12.3V	12.3V	0.6V			11.8V	0V	
Q505,506	2SD863	0.6V	0.6V	8.1V					

SERVO P.C.BOARD

(BOTTOM VIEW)


TEST PORT C
TP09
FOK
TS0
TP11
TP12
HFD
FOK'
TP10
TP07
VR205
IC212
IC211
IC210
IC209
IC208
IC207
IC206
IC205
IC204
IC203
IC202
IC201
IC213
IC214
IC215
IC216
IC217
IC218
IC219
TP18
TP19
TP20
VR203
CN09
VR201
D219
TP06
CI'
MCES
TP05
HF
TP04
TEST PORT B
TP01
TP02
VR204
VR207
GND
F.E
TP08
TP13
F.COIL
TP14
T.COIL
TEST PORT A
TP16
MV-EQ
TP15
TP17
T.OFFSET
VR202
TEST SW
OFF
ON
F OFFSET
VR206
Q201
Q202
Q203
Q204
Q205
Q206
Q207
Q208
Q209
Q210
Q211
Q212
Q213
Q214
Q215
Q216
Q217
Q218
Q219
L201
CN08
CN07
CN06
CN01
CN02
CN16
CN05
CN04
CN03

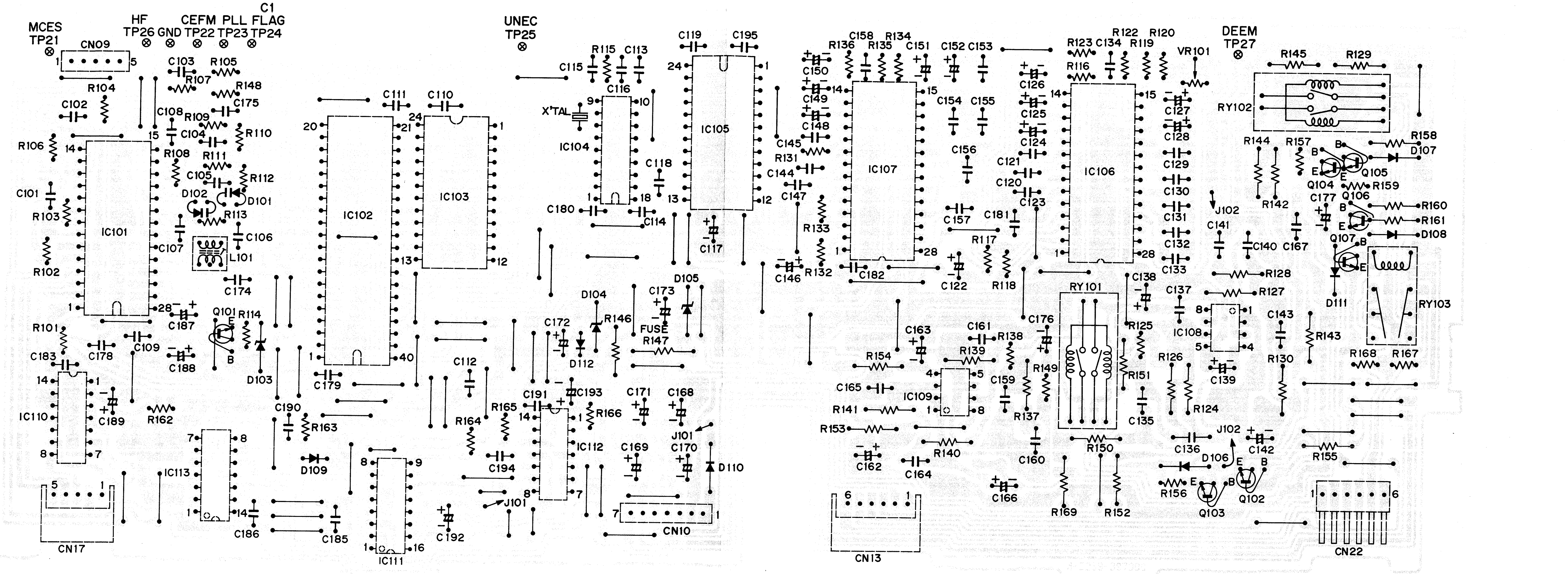
IC PIN NUMBERS DC VOLTAGES (STOP MODE)																	
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC201	TC40H004P	2.4V	2.5V	2.4V	2.4V	2.4V	2.4V	0V	2.4V	2.4V	2.4V	2.4V	2.6V	2.4V	5.0V		
IC202	TC40H004P	2.4V	2.4V	2.4V	2.4V	2.5V	1.8V	0V	2.4V	2.4V	2.4V	2.4V	2.4V	2.4V	5.0V		
IC203	TC40H004P	2.4V	2.3V	2.3V	2.6V	2.6V	2.4V	0V	2.6V	2.4V	2.4V	2.4V	2.5V	2.4V	5.0V		
IC204	MSM4049RS	5.0V	2.3V	2.4V	1.8V	2.1V	2.2V	2.2V	0V	4.4V	0V	0V	4.9V	–	2.6V	2.0V	–
IC205	HD74LS08P	2.4V	2.3V	0.2V	2.6V	2.0V	0.2V	0V	—	—	—	—	—	—	5.0V		
IC206	LA6458DS	3.6V	1.8V	1.8V	–12.3V	1.8V	1.8V	0V	12.4V								
IC207	LA6458DS	11.6V	2.7V	3.3V	–12.3V	–	–	–	12.4V								
IC208	MSM4049RS	5.0V	—	—	2.6V	2.0V	2.0V	2.2V	0V	2.6V	2.2V	0V	5.0V	–	6.2V	0V	–
IC209	MSM4030RS	2.2V	2.2V	2.0V	5.0V	5.0V	0V	0V	0V	0V	0V	5.0V	5.0V	0V	5.0V		
IC210	MSM4011BRS	2.0V	0V	5.0V	2.5V	5.0V	2.0V	0V	2.5V	0V	5.0V	0V	5.0V	5.0V	5.0V		
IC211	MSM4011BRS	5.0V	0V	5.0V	5.0V	0V	0V	0V	5.0V	5.0V	0V	0V	5.0V	5.0V	5.0V		
IC212	MSM4001BRS	–	–	–	–	–	–	0V	0V	0V	5.0V	5.0V	0V	0V	5.0V		
IC213	LA6458SS	12.4V	11.8V	2.5V	5.0V	0V	2.3V	2.3V	0V	–							
IC214	LA6458DS	0V	0V	0V	–12.3V	0V	0V	0V	12.4V								

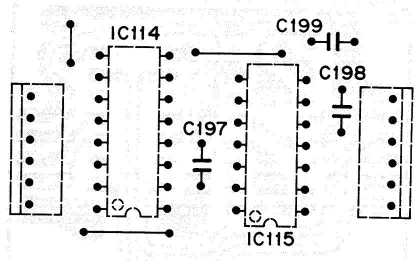
IC NUMBERS DC VOLTAGES (STOP MODE)																	
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC215	MSM4053RS	0V	0V	0V	0V	0V	0V	–6.1V	0V	0V	0V	0V	–	0V	0V	0V	5.0V
IC216	NJM2058D	0V	0V	0V	12.4V	0V	0V	0V	0.1V	0V	0V	–12.3V	0V	0V	0V		
IC217	LA6458DS	0.5V	0V	0V	–12.3V	0V	0V	0V	12.4V								
IC218	MSM4049RS	5.0V	0V	5.0V	5.0V	0V	2.1V	2.1V	0V	4.2V	0V	5.0V	0V	–	5.0V	0V	–
IC219	NJM2058D	0.5V	0.5V	0.5V	12.4V	0V	0V	0V	0.1V	0V	0V	–12.3V	0.1V	0.1V	0V		

TRANSISTOR DC VOLTAGES (STOP MODE)														
SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E
Q201	2SC536	–0.2V	8.7V	–0.8V	Q207	2SB764	–0.5V	–12.3V	0V	Q214	2SD863	0.5V	12.3V	2.1V
Q202	2SC536	0V	8.7V	–0.8V	Q208	2SD1012	0V	0.1V	0V	Q215	2SB764	0.5V	–12.3V	2.1V
Q204	2SD863	0.9V	11.2V	0.3V	Q209	2SD863	1.5V	11.9V	0V	Q216	2SA608	4.3V	5.0V	5.0V
Q205	2SB764	–0.3V	–12.2V	0.3V	Q210	2SB764	1.5V	–11.8V	0V	Q217	2SD438	–16.5V	–17.3V	–17.3V
Q206	2SD863	0.2V	12.4V	0V	Q211	2SB511	11.9V	0V	12.4V	Q218	2SC536	1.5V	12.4V	0.8V
		D	G	S	Q212	2SD325	–11.8V	0V	–12.3V	Q219	2SC536	0V	0.5V	0V
Q203	2SK44	0V	0V	0V	Q213	2SC536	0V	0,8V	0V					

DECODER P.C.BOARD

(BOTTOM VIEW)

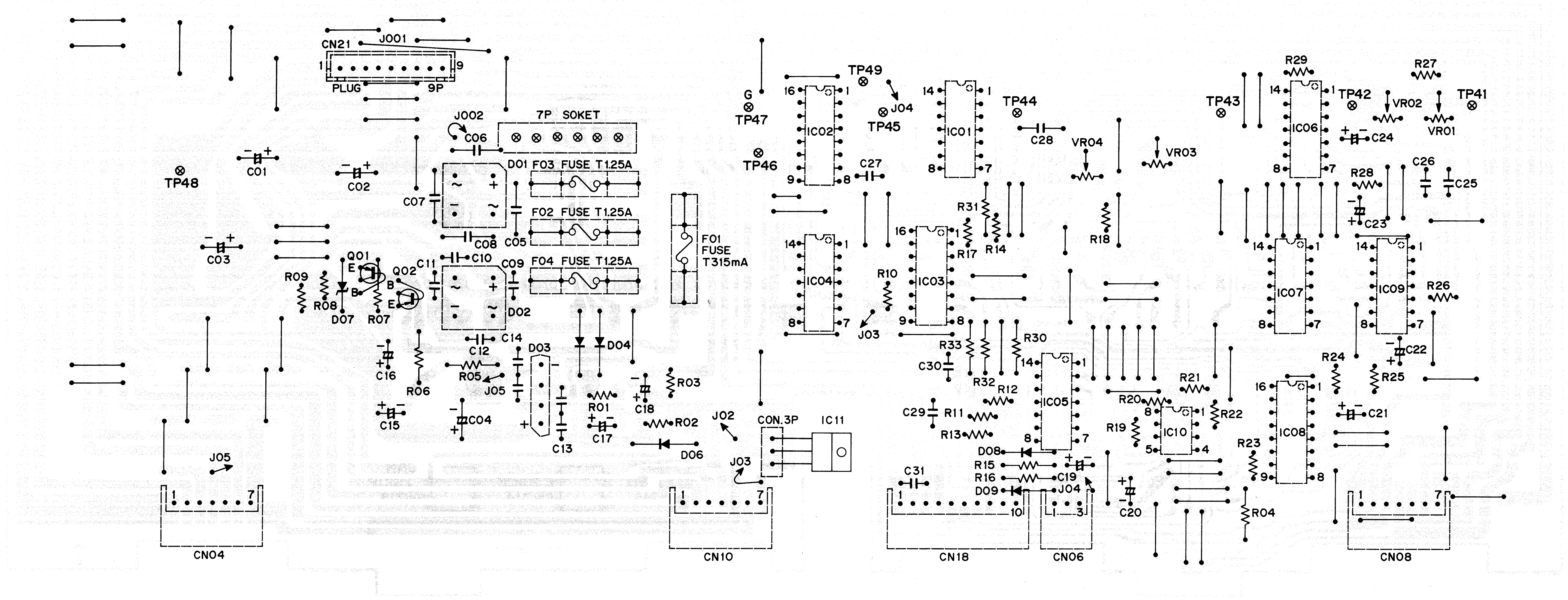

MCES TP21
CN09
HF TP26
GND
CEFM TP22
PLL TP23
C1 FLAG TP24
UNEC TP25
DEEM TP27
IC101
IC102
IC103
IC104
IC105
IC106
IC107
IC108
IC109
IC110
IC111
IC112
IC113
X'TAL
L101
FUSE
RY101
RY102
RY103
VR101
J101
J102
Q101
Q102
Q103
Q104
Q105
Q106
Q107
D101
D102
D103
D104
D105
D106
D107
D108
D109
D110
D111
D112
R101
R102
R103
R104
R105
R106
R107
R108
R109
R110
R111
R112
R113
R114
R115
R116
R117
R118
R119
R120
R122
R123
R124
R125
R126
R127
R128
R129
R130
R131
R132
R133
R134
R135
R136
R137
R138
R139
R140
R141
R142
R143
R144
R145
R146
R147
R148
R149
R150
R151
R152
R153
R154
R155
R156
R157
R158
R159
R160
R161
R162
R163
R164
R165
R166
R167
R168
R169
C101
C102
C103
C104
C105
C106
C107
C108
C109
C110
C111
C112
C113
C114
C115
C116
C117
C118
C119
C120
C121
C122
C123
C124
C125
C126
C127
C128
C129
C130
C131
C132
C133
C134
C135
C136
C137
C138
C139
C140
C141
C142
C143
C144
C145
C146
C147
C148
C149
C150
C151
C152
C153
C154
C155
C156
C157
C160
C161
C162
C163
C164
C165
C166
C167
C168
C169
C170
C171
C172
C173
C174
C175
C176
C177
C178
C179
C180
C181
C182
C183
C185
C186
C187
C188
C189
C190
C191
C192
C193
C194
C195
CN10
CN13
CN17
CN22


IC114
IC115
C197
C198
C199

IC PIN NUMBERS DC VOLTAGES (STOP MODE)																					
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
IC101	SAA7011	–2.6V	5.0V	0V	1.8V	5.0V	5.0V	1.9V	1.8V	2.1V	2.1V	–	4.9V	5.0V	0V	11.8V	1.5V	3.7V	0V	0V	1.9V
IC102	SAA7020	–2.6V	0V	5.0V	4.6V	2.9V	2.2V	3.9V	0.3V	2.3V	2.3V	2.3V	2.3V	2.3V	2.5V	2.5V	1.8V	2.5V	2.5V	1.7V	0V
IC103	TMM2016P	1.8V	2.5V	2.5V	2.3V	2.3V	2.3V	2.3V	2.3V	0.6V	3.8V	0.7V	0V	0.6V	0.6V	3.8V	3.9V	3.9V	0V	1.7V	1.2V
IC104	SAA7000	–2.6V	0V	1.2V	1.6V	5.0V	2.5V	0.8V	2.0V	0V	11.8V	0.4V	0V	1.7V	0.5V	1.7V	0V	0V	5.0V		
IC105	SAA7030	–2.6V	5.0V	0.9V	–	–	1.0V	–	–	–	0.8V	0V	0V	11.8V	–	1.1V	1.1V	1.7V	0.5V	2.5V	1.7V
IC106,107	TDA1540D	0.9V	0.4V	–4.1V	5.0V	–	0V	–5.2V	–13.2V	–13.2V	–16.7V	–17.5V	–9.1V	–6.7V	–7.0V	–9.2V	–9.9V	–9.9V	–4.9V	–4.7V	–3.0V
IC108,109	LM833N	0V	0V	0V	–11.3V	0V	0V	0V	10.8V												
IC110	TC40H000P	5.0V	5.0V	0V	0V	0V	5.0V	0V	5.0V	0V	0V	0V	5.0V	5.0V	5.0V						
IC111	MSM4049RS	5.0V	5.0V	0V	0V	5.0V	3.2V	1.6V	0V	5.0V	0V	0V	5.0V	–	5.0V	0V	–				
IC112	MSM4081	0V	0V	0V	0V	0V	0V	0V	5.0V	0V	0V	0V	0V	0V	5.0V						
IC113	MSM4025RS	5.0V	5.0V	0V	0V	0.7V	5.0V	0V	5.0V	0V	5.0V	0V	0V	0V	5.0V						
IC114	HD74LS175	5.1V	2.0V	–	2.5V	2.0V	2.2V	1.5V	0V	0.4V	3.1V	–	3.8V	0.4V	–	0.4V	5.1V				
IC115	HD74LS86	2.6V	5.1V	1.4V	1.4V	5.1V	1.9V	0V	0.4V	1.9V	2.6V	–	–	–	5.1V						
		21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
IC101	SAA7011	1.9V	2.2V	0V	0.4V	3.8V	2.0V	2.5V	5.1V												
IC102	SAA7020	11.8V	5.0V	2.5V	4.3V	1.2V	–	1.2V	3.9V	3.9V	3.8V	0.6V	0.6V	0.7V	3.8V	0.6V	5.0V	1.6V	0V	0V	5.0V
IC103	TMM2016P	4.3V	2.5V	2.5V	5.0V																
IC104	SAA7000																				
IC105	SAA7030	0V	5.0V	5.0V	5.0V																
IC106,107	TDA1540D	–3.0V	0V	–2.6V	–2.6V	–2.3V	–	–	1.0V												

TRANSISTOR DC VOLTAGES (STOP MODE)																			
SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E	SYMBOL No.	DEVICE	B	C	E
Q101	2SD400	5.7V	11.8V	5.1V	Q103	2SD1012	0V	5.0V	0V	Q105	2SD1012	0.7V	.0V	0V	Q107	2SD1012	0.7V	0V	0V
Q102	2SC536	0.7V	0V	0V	Q104	2SC536	1.4V	0.8V	0.7V	Q106	2SC536	1.4V	0.8V	0.7V					

POWER SUPPLY & INTERFACE P.C.BOARD
(BOTTOM VIEW)

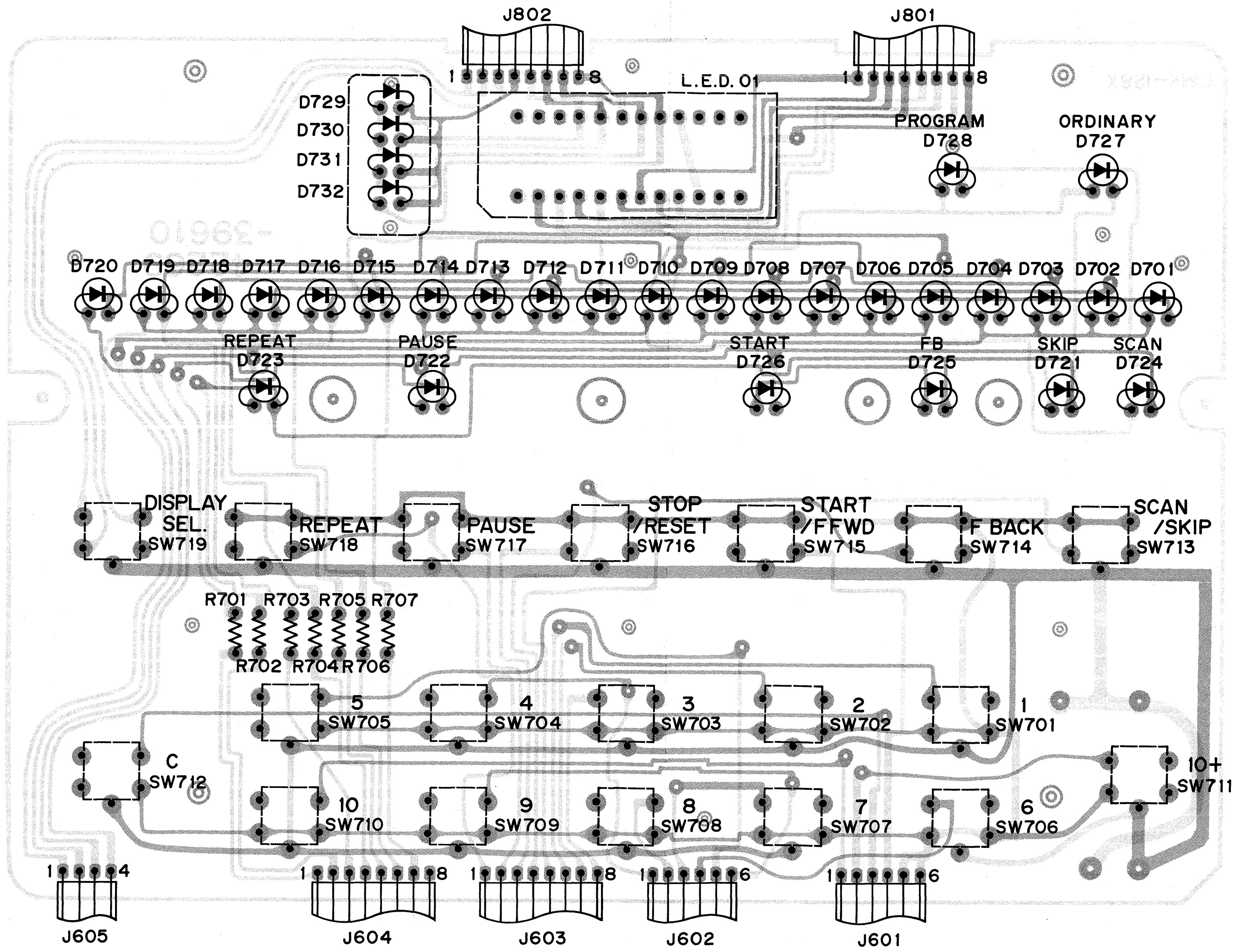

CN21
J001
1
9
PLUG
9P
J002
7P SOKET
C06
D01 F03 FUSE T1.25A
F02 FUSE T1.25A
F04 FUSE T1.25A
F01
FUSE
T315mA
C01
C02
C03
C07
C08
C05
C10
C09
C11
Q01
Q02
E
B
R09
R08
D07
R07
D02
C14
C12
C16
R06
R05
J05
D03
D04
C15
C04
R01
C18
R03
C17
C13
R02
J02
D06
CON.3P
IC11
J03
TP48
G
TP47
TP46
TP49
J04
TP45
TP44
C28
VR04
VR03
IC02
IC01
IC04
IC03
C27
R31
R17
R14
R18
R10
R33
R30
C30
R32
R12
C29
R11
R13
IC05
D08
R15
R16
D09
C19
C20
C31
R21
R20
R22
R19
IC10
TP43
R29
IC06
TP42
VR02
R27
TP41
VR01
C24
R28
C26
C25
C23
IC07
IC09
R26
R24
C22
R25
IC08
C21
R23
R04
CN04
CN10
CN18
CN06
CN08
14
16
8
7
1
10
3
5
4

IC PIN NUMBERS DC VOLTAGES (STOP MODE)																	
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC01	MSM4081	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	0V	0V	0V	0V	0V	0V	5.0V	5.0V		
IC02	MSM4040RS	–	0V	–	5.0V	–	–	–	0V	–	5.0V	0V	5.0V	0V	–	–	5.0V
IC03	MSM4049RS	5.0V	0V	5.0V	0V	5.0V	0V	5.0V	0V	5.0V	0V	0V	5.0V	–	0V	5.0V	–
IC04	MSM4011BRS	5.0V	5.0V	0V	5.0V	0V	2.6V	0V	–	–	–	0V	5.0V	5.0V	5.0V		
IC05	MSM4012RS	0V	5.0V	5.0V	5.0V	5.0V	–	0V	–	5.0V	5.0V	5.0V	5.0V	0V	5.0V		
IC06	MSM4011BRS	–	–	–	5.0V	5.0V	0V	0V	0V	0V	5.0V	5.0V	0V	0V	5.0V		
IC07	MSM4011BRS	5.0V	5.0V	0V	5.0V	0V	0V	0V	0V	0V	5.0V	0V	5.0V	5.0V	5.0V		
IC08	MSM4049RS	5.0V	5.0V	0V	0V	5.0V	5.0V	0V	0V	5.8V	0V	0V	5.0V	–	–	–	–
IC09	MSM4011BRS	5.0V	5.0V	0V	5.0V	0V	0V	0V	0V	0V	5.0V	0V	5.0V	5.0V	5.0V		
IC10	NJM072D	0V	0V	0V	–12.3V	0V	0V	0V	12.3V								
IC11	NJM78M12	11.8V	0V	20.0V													

TRANSISTOR DC VOLTAGES (STOP MODE)				
SYMBOL No.	DEVICE	B	C	E
Q01	2SA608	–10.1V	–18.1V	–9.5V
Q02	2SB560	–18.1V	–23.7V	–17.5V

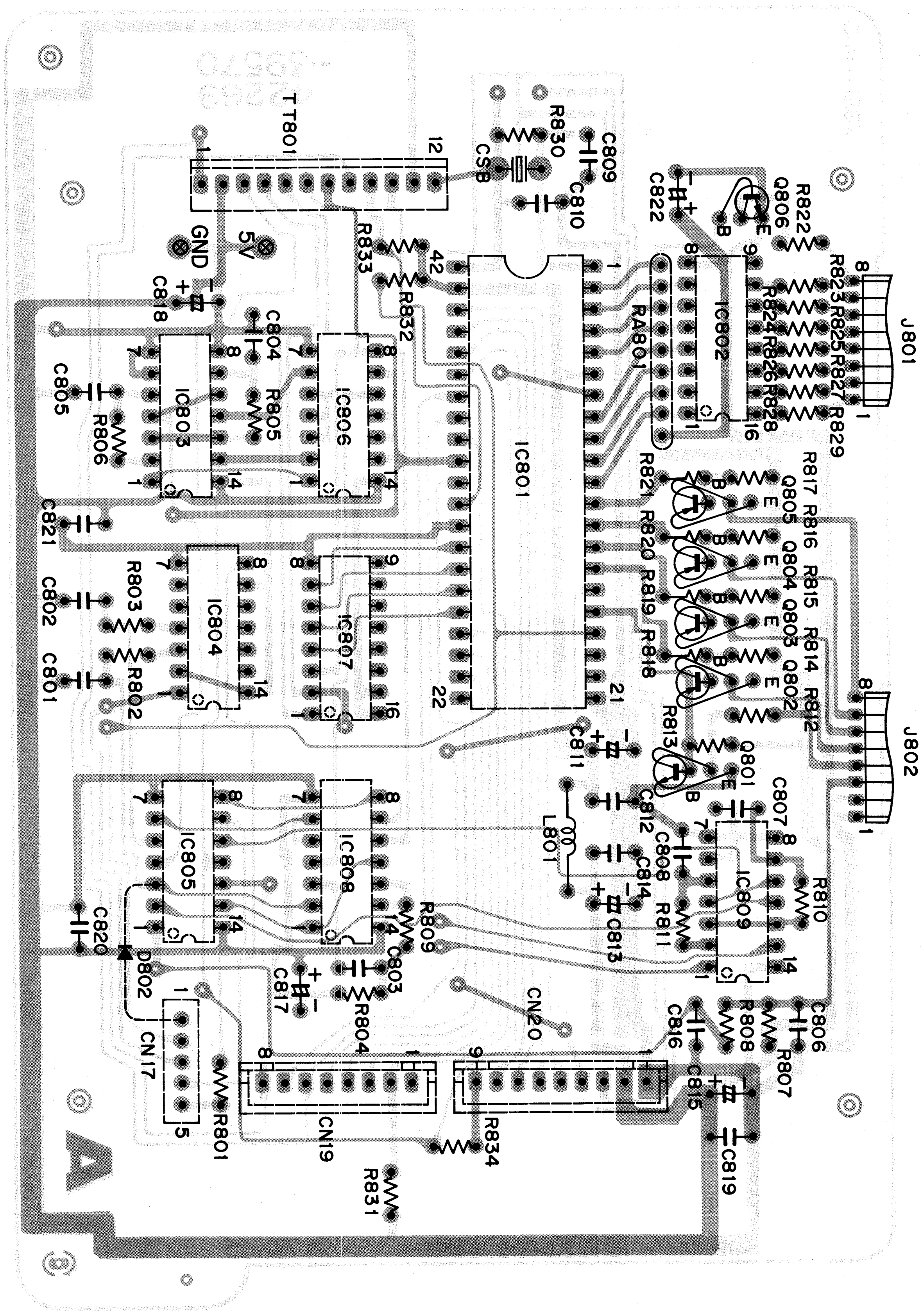
KEYBOARD SW P.C.BOARD

(BOTTOM VIEW)


J802
J801
1
8
L.E.D. 01
D729
D730
D731
D732
PROGRAM
D728
ORDINARY
D727
D720 D719 D718 D717 D716 D715 D714 D713 D712 D711 D710 D709 D708 D707 D706 D705 D704 D703 D702 D701
REPEAT
D723
PAUSE
D722
START
D726
FB
D725
SKIP
D721
SCAN
D724
DISPLAY SEL.
SW719
REPEAT
SW718
PAUSE
SW717
STOP /RESET
SW716
START /FFWD
SW715
F BACK
SW714
SCAN /SKIP
SW713
R701 R703 R705 R707
R702 R704 R706
5
SW705
4
SW704
3
SW703
2
SW702
1
SW701
C
SW712
10+
SW711
10
SW710
9
SW709
8
SW708
7
SW707
6
SW706
1
4
J605
1
8
J604
1
8
J603
1
6
J602
1
6
J601

DISPLAY MICOM P.C.BOARD

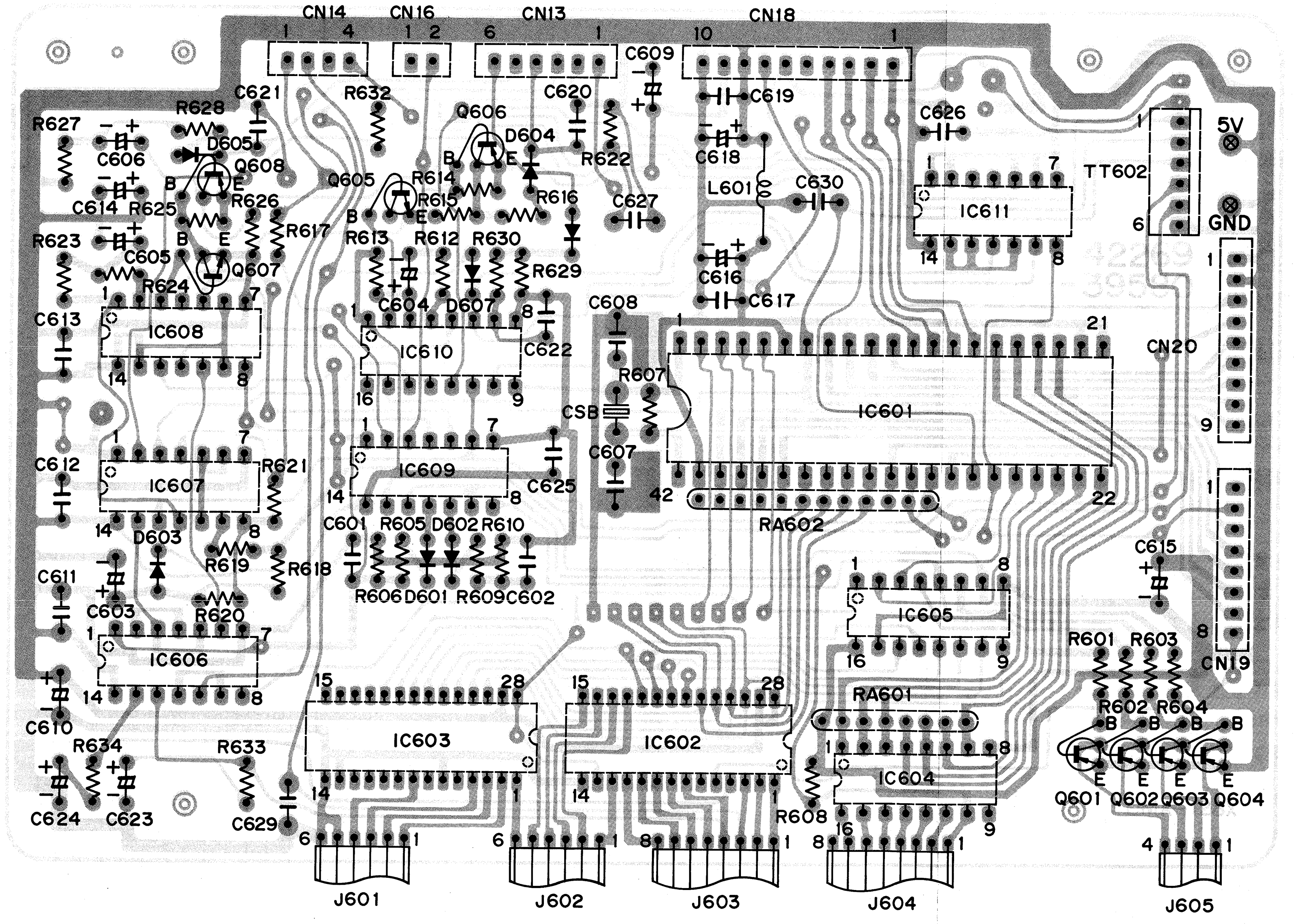
(BOTTOM VIEW)


J801
J802
R822
Q806
R823 R825 R827 R829
R824 R826 R828
IC802
C822
RA801
R817 R816 R815 R814 R812
Q805 Q804 Q803 Q802
Q801
R821 R820 R819 R818
R813
C807
IC809
R810
C806
R807
R808
C816
C815
C819
C808
R811
C812
C814
C813
C811
L801
C809
C810
R830
CSB
IC801
CN20
R834
R832
R833
TT801
IC806
IC807
IC808
R809
C803
R804
CN19
R831
C817
C804
R805
5V
GND
C818
IC803
IC804
IC805
R801
CN17
D802
R803
R802
R806
C805
C821
C802
C801
C820
A

IC PIN NUMBERS DC VOLTAGES (STOP MODE)																						
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
IC801	LM6402A	1.8V	0V	0V	0V	0V	5.0V	5.0V	0V	0V	0V	0V	3.4V	4.1V	4.1V	4.1V	5.0V	0.3V	0V	–	0V	0V
IC802	LB1211	0V	0V	0V	0V	0V	0V	0V	0V	–	3.5V	3.6V	3.6V	3.6V	3.6V	3.8V	3.8V					
IC803	MSM4013RS	1.7V	1.7V	1.7V	0V	1.7V	0V	0V	0V	1.8V	0V	1.8V	1.8V	1.8V	5.0V							
IC804	HD74LS164	5.0V	5.0V	4.4V	4.4V	–	–	0V	0V	5.0V	–	–	–	–	5.0V							
IC805	MSM4584RS	4.9V	0V	4.4V	0V	4.4V	0V	0V	1.8V	1.8V	0V	5.0V			5.0V							
IC806	MSM4023RS	1.7V	1.8V	1.8V	1.8V	1.8V	1.8V	0V	1.7V	4.4V	0.5V	4.4V	4.4V	4.4V	5.0V							
IC807	MSM4094RS	0.5V	5.0V	1.8V	5.0V	5.0V	5.0V	5.0V	0V	–	–	–	–	–	–	5.0V	5.0V					
IC808	MSM4011BRS	5.0V	4.4V	0V	5.0V	0V	0V	0V	1.8V	1.8V	1.8V	5.0V	0V	0V	5.0V							
IC809	MSM4013RS	0V	5.0V	5.0V	0V	5.0V	0V	0V	0V	5.0V	0V	0V	5.0V	0V	5.0V							
		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
IC801	LM6402A	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	0V	4.7V	5.0V	0V	4.8V	0V	0V	0V	0V	0V	0V	5.0V	2.3V

TRANSISTOR DC VOLTAGES (STOP MODE)				
SYMBOL No.	DEVICE	B	C	E
Q801	2SC536	0.3V	3.0V	0V
Q802	2SB698	4.8V	1.2V	5.0V
Q803	2SB698	4.9V	1.2V	5.0V
Q804	2SB698	4.9V	0.2V	5.0V
Q805	2SB698	4.8V	1.5V	5.0V
Q806	2SC536	0V	1.7V	0V

PROGRAM P.C.BOARD
(BOTTOM VIEW)



CN14
CN16
CN13
CN18
CN20
CN19
IC601
IC602
IC603
IC604
IC605
IC606
IC607
IC608
IC609
IC610
IC611
RA601
RA602
TT602
L601
CSB
5V
GND
Q601
Q602
Q603
Q604
Q605
Q606
Q607
Q608
D601
D602
D603
D604
D605
D607
R601
R602
R603
R604
R605
R606
R607
R608
R609
R610
R612
R613
R614
R615
R616
R617
R618
R619
R620
R621
R622
R623
R624
R625
R626
R627
R628
R629
R630
R632
R633
R634
C601
C602
C603
C604
C605
C606
C607
C608
C609
C610
C611
C612
C613
C614
C615
C616
C617
C618
C619
C620
C621
C622
C623
C624
C625
C626
C627
C629
C630
J601
J602
J603
J604
J605

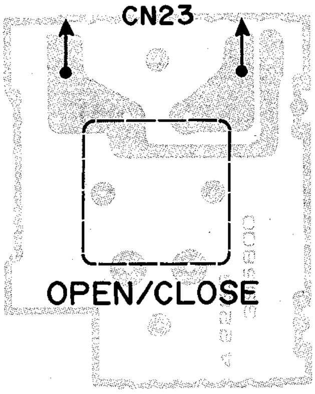
IC PIN NUMBERS DC VOLTAGES (STOP MODE)

SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
IC601	LM6402A	1.7V	0.4V	0.4V	4.1V	0V	5.0V	5.0V	0V	0V	0V	0V	5.0V	5.0V	5.0V	5.0V	0.1V	0.3V	0.1V	0.1V	0V	0V
IC602	LC7800	5.0V	5.0V	5.0V	5.0V	0V	–	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	4.1V	0V	5.0V	5.0V	5.0V	5.0V	0.5V	4.8V	4.8V
IC603	LC7800	5.0V	5.0V	5.0V	5.0V	–	0V	–	5.0V	–	–	–	–	0V	0V	–	–	–	–	0.5V	4.9V	4.8V
IC604	LB1211	0.1V	0.1V	0.1V	0.1V	0.1V	0.3V	0.1V	0V	–	5.0V	3.8V	4.7V	4.6V	4.7V	4.7V	4.6V					
IC605	MSM4556RS	0V	1.3V	3.0V	0.3V	4.1V	3.0V	4.2V	0V	4.8V	4.8V	4.8V	0.5V	0.4V	0.4V	0V	5.0V					
IC606	MSM4011BRS	0V	0V	5.0V	0V	5.0V	5.0V	0V	0V	0V	4.7V	0V	5.0V	5.0V	5.0V							
IC607	MSM4011BRS	5.0V	5.0V	0V	5.0V	0V	0V	0V	4.7V	4.8V	0V	0V	5.0V	5.0V	5.0V							
IC608	MSM4030RS	0V	0V	0V	5.0V	0V	5.0V	0V	0V	5.0V	5.0V	0V	4.8V	5.0V	5.0V							
IC609	MSM4001	4.8V	0V	0V	0V	5.0V	5.0V	0V	4.1V	5.0V	0V	0V	5.0V	4.2V	5.0V							
IC610	MSM4049RS	5.0V	0V	5.0V	5.0V	0V	5.0V	0V	0V	1.7V	2.7V	5.0V	0V	–	0V	5.0V	–					
IC611	MSM4001BRS	–	–	–	–	–	–	0V	4.8V	5.0V	0V	5.0V	0V	0V	5.0V							
		22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
IC601	LM6402A	0.1V	0.1V	0.1V	1.3V	3.0V	4.8V	0V	5.0V	5.0V	5.0V	5.0V	4.9V	4.9V	5.0V	5.0V	5.0V	5.0V	5.0V	5.0V	5.1V	2.3V
IC602	LC7800	4.8V	4.9V	4.9V	5.0V	5.0V	5.0V	5.0V														
IC603	LC7800	4.8V	4.9V	4.9V	5.0V	5.0V	5.0V	4.1V														

SYMBOL No.	DECIVE	B	C	E
Q601	2SB698	4.9V	1.7V	5.0V
Q602	2SB698	4.9V	1.1V	5.0V
Q603	2SB698	4.7V	2.4V	5.0V
Q604	2SB698	4.9V	1.0V	5.0V
Q605	2SC3400	0V	12.3V	0V
Q606	2SA1345	12.3V	12.3V	0V
Q607	2SC3400	0V	12.3V	0V
Q608	2SA1345	12.3V	12.3V	0V

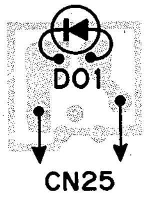
PUSH SW P.C.BOARD

(BOTTOM VIEW)


CN23
OPEN/CLOSE

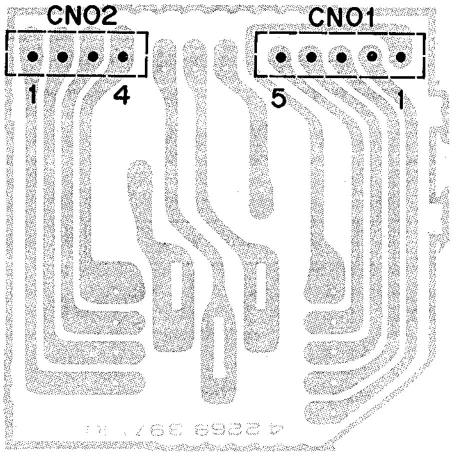
POWER IND. P.C.BOARD

(BOTTOM VIEW)



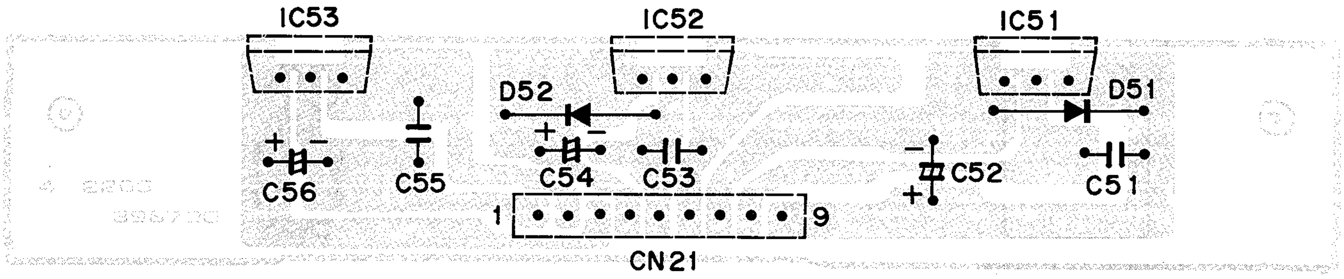
PICKUP P.C.BOARD

(BOTTOM VIEW)


CN02
1
4
CN01
5
1

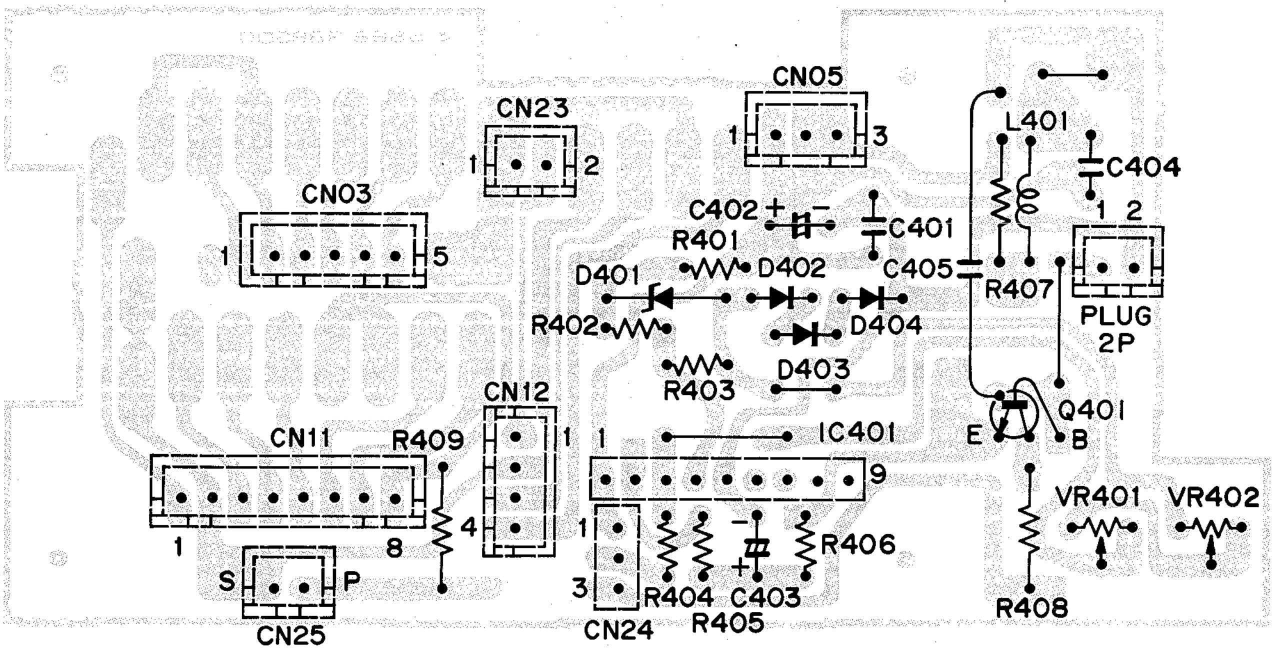
POWER SUPPLY P.C.BOARD

(BOTTOM VIEW)


IC53
IC52
IC51
D52
D51
C56
C55
C54
C53
C52
C51
1
9
CN21

LASER P.C.BOARD

(BOTTOM VIEW)


CN05
1
3
CN23
1
2
L401
C404
CN03
1
5
C402
C401
R401
1 2
D401
D402
C405
R407
PLUG 2P
R402
D404
R403
D403
CN12
Q401
E
B
CN11
R409
1
IC401
9
1
8
4
VR401
VR402
1
3
S
P
CN25
CN24
R404
C403
R405
R406
R408

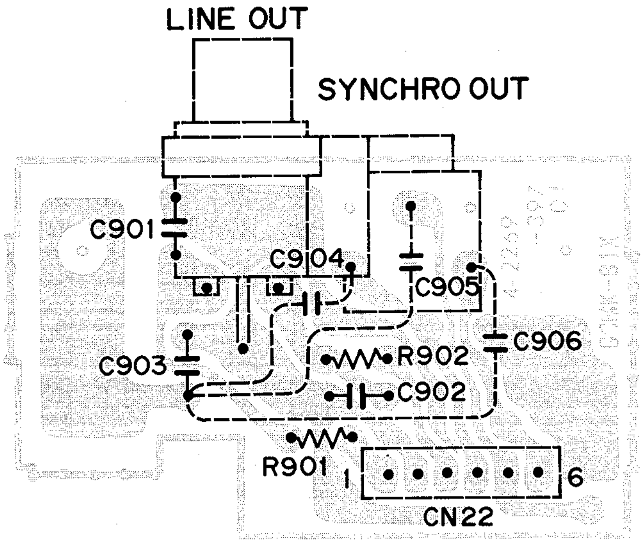
IC PIN NUMBERS DC VOLTAGES (PLAY MODE)										
SYMBOL No.	DEVICE	1	2	3	4	5	6	7	8	9
IC401	LA6458SS	0V	−13.2V	−13.4V	−13.4V	−16.6V	−	−	−	−

TRANSISTOR DC VOLTAGES (PLAY MODE)				
SYMBOL No.	DEVICE	B	C	E
Q401	2SD330	−13.5V	−2.39V	−14.0V

All voltages = 0V in the stop mode.

OUTPUT P.C.BOARD

(BOTTOM VIEW)

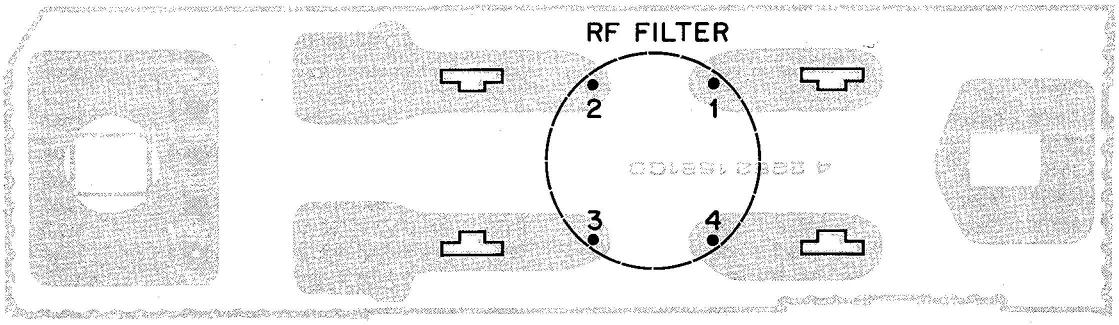


LINE OUT
SYNCHRO OUT
C901
C904
C905
C906
C903
R902
C902
R901
1
6
CN22

IC PIN NUMBERS DC VOLTAGES				
SYMBOL No.	DEVICE	1	2	3
IC51	NJM7912	–12.3V	–20.0V	0V
IC52	NJM7812	12.3V	0V	20.0V
IC53	NJM7805	5.0V	0V	8.9V

FILTER P.C.BOARD

(BOTTOM VIEW)



RF FILTER
2
1
3
4

PARTS LIST

Ref. No.	Part No.	Description				Q'ty
	SERVO P.C.B. ASSY					
	141 0 1939 00210	Servo P.C.B. Assy				1
	4 2319 76410	Dip Switch 4P				1
	4 2362 00900	Plug 8P				1
CN16	4 2369 73672	Plug 2P				1
CN09	4 2369 73674	Plug 5P				1
CN02	4 2369 71571	Connector 4P				1
CN01	4 2369 71581	Connector 5P				1
	4 2369 73150	Connector 5P				1
	4 2369 73410	Connector 7P				1
CN03	4 2359 76210	Connector Assy				1
CN04	4 2359 76211	Connector Assy				1
CN05	4 2359 76212	Connector Assy				1
CN06	4 2359 76213	Connector Assy				1
CN07	4 2359 76214	Connector Assy				1
CN08	4 2359 76215	Connector Assy				1
L201	4 2532 00370	Choke Coil 100μH				1
	4 2369 73781	Pin 1P				22
	121 3 1303 00611	+PMS M3X6				2
	131 2 6201 33900	Plate Heat Sink				1
VR201	4 2229 74290	Semi Fixed 33k-B				1
VR202	4 2229 74440	Semi Fixed 47k-B				1
VR203	4 2229 24490	Semi Fixed 4.7k-B				1
VR204	4 2229 74630	Semi Fixed 10k-B				1
VR205	4 2229 24490	Semi Fixed 4.7k-B				1
VR206	4 2229 74440	Semi Fixed 47k-B				1
VR207	4 2229 74310	Semi Fixed 10k-B				1
C201	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C202	CI2 2 3160 NG00R	Boundary	0.022μF	16V	±30%	1
C203	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C204	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C205	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C206	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C207	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C208	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C209	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C210	CC8 2 0500 KD00C	Ceramic	82pF	50V	±10%	1
C211	CC8 2 0500 KD00C	Ceramic	82pF	50V	±10%	1
C212	CC2 2 0500 KD00C	Ceramic	22pF	50V	±10%	1
C213	CC2 2 0500 KD00C	Ceramic	22pF	50V	±10%	1
C214	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C215	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C216	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C217	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C218	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C219	CM4 7 2500 K00SV	Mylar	0.0047μF	50V	±10%	1
C220	CD1 0 763A 0001V	Electrolytic	100μF	6.3V		1
C221	CM1 0 2500 K00SV	Mylar	0.001μF	50V	±10%	1
C222	CD2 2 5500 0001V	Electrolytic	2.2μF	50V		1
C223	CM1 0 2500 K00SV	Mylar	0.001μF	50V	±10%	1
C224	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C225	CC2 7 0500 KD00C	Ceramic	27pF	50V	±10%	1
C226	CI2 2 3160 NG00R	Boundary	0.022μF	16V	±30%	1
C227	CC2 2 0500 KD00C	Ceramic	22pF	50V	±10%	1
C228	CC2 2 0500 KD00C	Ceramic	22pF	50V	±10%	1
C231	CM1 0 2500 K00SV	Mylar	0.001μF	50V	±10%	1
C232	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C233	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C234	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C235	CM3 3 3500 K00SV	Mylar	0.033μF	50V	±10%	1
C236	CD3 3 5500 0001V	Electrolytic	3.3μF	50V		1
C237	CM1 0 2500 K00SV	Mylar	0.001μF	50V	±10%	1
C238	CM1 5 4500 J00TV	Mylar	0.15μF	50V	±5%	1
C239	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C240	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C241	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C242	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C243	CD2 2 763A 0001V	Electrolytic	220μF	6.3V		1
C244	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C245	CC4 7 1500 KD00C	Ceramic	470pF	50V	±10%	1
C246	CM3 3 3500 K00SV	Mylar	0.033μF	50V	±10%	1
C247	4 2239 71350	Electrolytic	100μF	16V		1
C248	4 2239 71350	Electrolytic	100μF	16V		1
C250	CC2 7 0500 KD00C	Ceramic	27pF	50V	±10%	1
C251	CC2 7 0500 KD00C	Ceramic	27pF	50V	±10%	1
C252	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C253	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C254	CM6 8 3500 K00SV	Mylar	0.068μF	50V	±10%	1
C255	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C256	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C257	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C258	CB2 2 6100 0000V	None-polar	22μF	10V		1
C259	CI2 2 3160 NG00R	Boundary	0.022μF	16V	±30%	1
C260	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C261	CM5 6 3500 K00SV	Mylar	0.056μF	50V	±10%	1
C262	CM6 8 2500 K00SV	Mylar	0.0068μF	50V	±10%	1
C263	CM1 5 3500 K00SV	Mylar	0.015μF	50V	±10%	1
C264	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C265	CM1 2 3500 K00SV	Mylar	0.012μF	50V	±10%	1
C266	CM1 5 4500 J00TV	Mylar	0.15μF	50V	±5%	1
C267	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C268	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C269	CM1 5 2500 K00SV	Mylar	0.0015μF	50V	±10%	1
C270	CM1 5 3500 K00SV	Mylar	0.015μF	50V	±10%	1
C271	CM6 8 3500 K00SV	Mylar	0.068μF	50V	±10%	1
C272	CC4 7 1500 KD00C	Ceramic	470pF	50V	±10%	1
C273	CM3 3 3500 K00SV	Mylar	0.033μF	50V	±10%	1
C274	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C275	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C276	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C277	CM8 2 2500 K00SV	Mylar	0.0082μF	50V	±10%	1
C278	CM4 7 3500 K00SV	Mylar	0.047μF	50V	±10%	1
C279	CC4 7 1500 KD00C	Ceramic	470pF	50V	±10%	1
C282	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C283	CM1 5 3500 K00SV	Mylar	0.015μF	50V	±10%	1
C284	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C285	CM1 5 4500 J00TV	Mylar	0.15μF	50V	±5%	1
C286	CD2 2 4500 0001V	Electrolytic	0.22μF	50V		1
C287	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C288	CD2 2 5500 0001V	Electrolytic	2.2μF	50V		1
C289	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C290	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C291	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C292	CD1 0 6250 0001V	Electrolytic	10μF	25V		1
C293	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C294	CC8 2 0500 KD00C	Ceramic	82pF	50V	±10%	1
C295	CC8 2 0500 KD00C	Ceramic	82pF	50V	±10%	1
C296	CD1 0 6500 0001V	Electrolytic	10μF	50V		1
D201	202 5 1420 00128	Diode, GMA 01				1
D202	202 5 1420 00128	Diode, GMA 01				1
D203	202 5 1420 00128	Diode, GMA 01				1
D204	202 5 1420 00128	Diode, GMA 01				1
D205	202 5 1420 00128	Diode, GMA 01				1
D206	202 5 1420 00128	Diode, GMA 01				1
D207	202 5 1420 00128	Diode, GMA 01				1
D208	202 5 1420 00128	Diode, GMA 01				1
D209	202 5 1420 00128	Diode, GMA 01				1
D210	202 5 1420 00128	Diode, GMA 01				1

PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
D211	202 5 1420 00128	Diode, GMA 01	1
D212	202 5 1420 00128	Diode, GMA 01	1
D213	202 5 1420 00128	Diode, GMA 01	1
D214	202 5 1420 00128	Diode, GMA 01	1
D215	202 5 1420 00128	Diode, GMA 01	1
D216	202 5 3200 03011	Zener Diode, GZA 3.0 X	1
D217	202 5 1420 00128	Diode, GMA 01	1
D218	202 5 1420 00128	Diode, GMA 01	1
D219	205 5 9040 44210	Diode, DS 442	1
D220	205 5 9040 44210	Diode, DS 442	1
IC201	4 2039 71250	IC, TC 40 H 004 P	1
IC202	4 2039 71250	IC, TC 40 H 004 P	1
IC203	4 2039 71250	IC, TC 40 H 004 P	1
IC204	4 2069 72530	IC, MSM 4049 RS	1
IC205	4 2069 72010	IC, HD 74 LS 08 P	1
IC206	206 5 2726 45810	IC, LA 6458 DS	1
IC207	206 5 2726 45810	IC, LA 6458 DS	1
IC208	4 2069 72530	IC, MSM 4049 RS	1
IC209	4 2069 72620	IC, MSM 4030 RS	1
IC210	4 2069 72340	IC, MSM 4011 BRS	1
IC211	4 2069 72340	IC, MSM 4011 BRS	1
IC212	4 2069 72330	IC, MSM 4001 BRS	1
IC213	206 5 3266 45810	IC, LA 6458 SS	1
IC214	206 5 2726 45810	IC, LA 6458 DS	1
IC215	4 2069 72640	IC, MSM 4053 RS	1
IC216	4 2039 71270	IC, NJM 2058 D	1
C217	206 5 2726 45810	IC, LA 6458 DS	1
C218	4 2069 72530	IC, MSM 4049 RS	1
C219	4 2039 71270	IC, NJM 2058 D	1
Q201	203 5 5000 53650	Transistor, 2SC 536 E,F	1
Q202	203 5 5000 53650	Transistor, 2SC 536 E,F	1
Q203	203 5 6530 04430	FET, 2SK 44 C,D	1
Q204	203 5 7340 86350	Transistor, 2SD 863 E,F	1
Q205	203 5 7350 76450	Transistor, 2SB 764 E,F	1
Q206	203 5 7340 86350	Transistor, 2SD 863 E,F	1
Q207	203 5 7350 76450	Transistor, 2SB 764 E,F	1
Q208	203 5 4921 01260	Transistor, 2SD 1012 F,G	1
Q209	203 5 7340 86350	Transistor, 2SD 863 E,F	1
Q210	203 5 7350 76450	Transistor, 2SB 764 E,F	1
Q211	203 5 8520 51150	Transistor, 2SB 511 E,F	1
Q212	203 5 8620 32550	Transistor, 2SD 325 E,F	1
Q213	203 5 5000 53660	Transistor, 2SC 536 F,G	1
Q214	203 5 7340 86350	Transistor, 2SD 863 E,F	1
Q215	203 5 7350 76450	Transistor, 2SB 764 E,F	1
Q216	203 5 7230 60850	Transistor, 2SA 608 E,F	1
Q217	203 5 6830 43850	Transistor, 2SD 438 E,F	1
Q218	203 5 5000 53650	Transistor, 2SC 536 E,F	1
Q219	203 5 5000 53650	Transistor, 2SC 536 E,F	1
R201	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R202	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R203	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R204	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R206	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R207	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R208	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R209	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R210	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R211	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R212	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R213	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R214	RD8 2 2161 JH000	Carbon 8.2kΩ 1/6W ±5%	1
R215	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R216	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R217	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1

Ref. No.	Part No.	Description	Q'ty
R218	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R220	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R221	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R222	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R223	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R224	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R225	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R226	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R227	RD1 5 3161 JH000	Carbon 15kΩ 1/6W ±5%	1
R228	RD1 5 3161 JH000	Carbon 15kΩ 1/6W ±5%	1
R229	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R230	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R231	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R232	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R233	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R234	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R235	RD6 8 2161 JH000	Carbon 6.8kΩ 1/6W ±5%	1
R236	RD6 8 2161 JH000	Carbon 6.8kΩ 1/6W ±5%	1
R237	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R238	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R239	RD3 9 2161 JH000	Carbon 3.9kΩ 1/6W ±5%	1
R240	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R241	RD1 0 2161 JH000	Carbon 1kΩ 1/6W ±5%	1
R242	RD2 7 3161 JH000	Carbon 27kΩ 1/6W ±5%	1
R243	RD2 7 3161 JH000	Carbon 27kΩ 1/6W ±5%	1
R244	RD2 7 3161 JH000	Carbon 27kΩ 1/6W ±5%	1
R245	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R246	RD2 7 3161 JH000	Carbon 27kΩ 1/6W ±5%	1
R247	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R248	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R249	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R250	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R251	RD4 7 2161 JH000	Carbon 4.7kΩ 1/6W ±5%	1
R252	RD4 7 2161 JH000	Carbon 4.7kΩ 1/6W ±5%	1
R253	RD1 0 5161 JH000	Carbon 1MΩ 1/6W ±5%	1
R254	RD1 0 5161 JH000	Carbon 1MΩ 1/6W ±5%	1
R255	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R256	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R257	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R258	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R259	RD1 5 3161 JH000	Carbon 15kΩ 1/6W ±5%	1
R260	RD2 7 2161 JH000	Carbon 2.7kΩ 1/6W ±5%	1
R262	RD5 6 3161 JH000	Carbon 56kΩ 1/6W ±5%	1
R263	RD1 2 4161 JH000	Carbon 120kΩ 1/6W ±5%	1
R264	RD4 7 4161 JH000	Carbon 470kΩ 1/6W ±5%	1
R265	RD1 5 3161 JH000	Carbon 15kΩ 1/6W ±5%	1
R266	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R267	RD2 7 3161 JH000	Carbon 27kΩ 1/6W ±5%	1
R268	RD2 7 3161 JH000	Carbon 27kΩ 1/6W ±5%	1
R269	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R270	RD1 0 1161 JH000	Carbon 100Ω 1/6W ±5%	1
R271	RD1 0 5161 JH000	Carbon 1MΩ 1/6W ±5%	1
R272	RD3 3 4161 JH000	Carbon 330kΩ 1/6W ±5%	1
R273	RD3 3 3161 JH000	Carbon 33kΩ 1/6W ±5%	1
R274	RD1 0 5161 JH000	Carbon 1MΩ 1/6W ±5%	1
R280	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R281	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R282	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R283	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R284	RD3 3 4161 JH000	Carbon 330kΩ 1/6W ±5%	1
R285	RD3 3 4161 JH000	Carbon 330kΩ 1/6W ±5%	1
R286	RD3 3 2161 JH000	Carbon 3.3kΩ 1/6W ±5%	1
R287	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1
R288	RD1 2 3161 JH000	Carbon 12kΩ 1/6W ±5%	1

PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
R289	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R290	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R291	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R292	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R293	RD4 7 3161 JH000	Carbon	47kΩ	1/6W	±5%	1
R294	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R295	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R296	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R297	RD2 2 4161 JH000	Carbon	220kΩ	1/6W	±5%	1
R298	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R299	RD1 8 4161 JH000	Carbon	180kΩ	1/6W	±5%	1
R300	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R301	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R302	RD1 2 4161 JH000	Carbon	120kΩ	1/6W	±5%	1
R303	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R304	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R305	RD8 2 3161 JH000	Carbon	82kΩ	1/6W	±5%	1
R306	RD3 3 2161 JH000	Carbon	3.3kΩ	1/6W	±5%	1
R307	RD3 3 2161 JH000	Carbon	3.3kΩ	1/6W	±5%	1
R310	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R311	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R312	RD3 3 3161 JH000	Carbon	33kΩ	1/6W	±5%	1
R313	RD4 7 2161 JH000	Carbon	4.7kΩ	1/6W	±5%	1
R314	RD3 3 4161 JH000	Carbon	330kΩ	1/6W	±5%	1
R315	RD5 6 3161 JH000	Carbon	56kΩ	1/6W	±5%	1
R316	RD2 2 5161 JH000	Carbon	2.2MΩ	1/6W	±5%	1
R317	RD1 5 3161 JH000	Carbon	15kΩ	1/6W	±5%	1
R318	RD3 3 3161 JH000	Carbon	33kΩ	1/6W	±5%	1
R320	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R321	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R322	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R323	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R324	RD5 6 3161 JH000	Carbon	56kΩ	1/6W	±5%	1
R325	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R326	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R327	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R329	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R330	RD5 6 2161 JH000	Carbon	5.6kΩ	1/6W	±5%	1
R331	RD3 9 2161 JH000	Carbon	3.9kΩ	1/6W	±5%	1
R332	RD1 5 4161 JH000	Carbon	150kΩ	1/6W	±5%	1
R333	RD1 5 3161 JH000	Carbon	15kΩ	1/6W	±5%	1
R334	RD3 3 1161 JH000	Carbon	330Ω	1/6W	±5%	1
R335	RD3 3 1161 JH000	Carbon	330Ω	1/6W	±5%	1
R336	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R337	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R338	RF2 2 A501 JH000	Mold	2.2Ω	1/2W	±5%	1
R339	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R340	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R341	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R342	RD1 5 4161 JH000	Carbon	150kΩ	1/6W	±5%	1
R343	RD1 5 3161 JH000	Carbon	15kΩ	1/6W	±5%	1
R344	RD3 3 1161 JH000	Carbon	330Ω	1/6W	±5%	1
R345	RD3 3 1161 JH000	Carbon	330Ω	1/6W	±5%	1
R346	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R347	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R348	RF3 9 0501 JZ000	Mold	39Ω	1/2W	±5%	1
R349	RF3 9 0501 JZ000	Mold	39Ω	1/2W	±5%	1
R350	RD3 3 2161 JH000	Carbon	3.3kΩ	1/6W	±5%	1
R351	RD4 7 2161 JH000	Carbon	4.7kΩ	1/6W	±5%	1
R352	RD6 8 3161 JH000	Carbon	68kΩ	1/6W	±5%	1
R353	RD6 8 3161 JH000	Carbon	68kΩ	1/6W	±5%	1
R354	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R355	RD4 7 2161 JH000	Carbon	4.7kΩ	1/6W	±5%	1
R356	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R357	RD6 8 3161 JH000	Carbon	68kΩ	1/6W	±5%	1
R358	RD4 7 3161 JH000	Carbon	47kΩ	1/6W	±5%	1
R359	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R360	RD1 5 3161 JH000	Carbon	15kΩ	1/6W	±5%	1
R361	RD1 5 4161 JH000	Carbon	150kΩ	1/6W	±5%	1
R362	RD1 8 4161 JH000	Carbon	180kΩ	1/6W	±5%	1
R363	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R364	RD1 2 2161 JH000	Carbon	1.2kΩ	1/6W	±5%	1
R365	RD6 8 3161 JH000	Carbon	68kΩ	1/6W	±5%	1
R366	RD6 8 1161 JH000	Carbon	680Ω	1/6W	±5%	1
R367	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R368	RD1 5 4161 JH000	Carbon	150kΩ	1/6W	±5%	1
R369	RD1 2 4161 JH000	Carbon	120kΩ	1/6W	±5%	1
R370	RD1 5 4161 JH000	Carbon	150kΩ	1/6W	±5%	1
R371	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R372	RD1 5 2161 JH000	Carbon	1.5kΩ	1/6W	±5%	1
R373	RD1 5 3161 JH000	Carbon	15kΩ	1/6W	±5%	1
R374	RD1 0 1161 JH000	Carbon	100Ω	1/6W	±5%	1
R375	RD1 0 1161 JH000	Carbon	100Ω	1/6W	±5%	1
R376	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R377	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R378	RD2 2 0161 JH000	Carbon	22Ω	1/6W	±5%	1
R379	RD1 0 1161 JH000	Carbon	100Ω	1/6W	±5%	1
R380	RH6 8 A102 JZ003	Metal	6.8Ω	1W	±5%	1
R381	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R382	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R383	RD3 3 2161 JH000	Carbon	3.3kΩ	1/6W	±5%	1
R384	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R385	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R386	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R387	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R388	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R389	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R390	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R391	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R392	RD2 2 5161 JH000	Carbon	2.2MΩ	1/6W	±5%	1
R393	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R394	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R395	RD2 2 5161 JH000	Carbon	2.2MΩ	1/6W	±5%	1
R396	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R397	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R398	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1

DISPLAY MICOM P.C.B. ASSY

Ref. No.	Part No.	Description				Q'ty
	141 0 1939 00220	Display Micom P.C.B. Assy				1
RA801	4 2219 70340	Resistor	2.2kΩ	x8	±5%	1
	4 2252 00090	CSB400P				1
	4 2362 00900	Plug 8P				1
CN17	4 2359 76223	Connector Assy				1
	4 2369 71901	Connector 12P Top				1
	4 2369 73690	Plug 9P				1
L801	4 2532 00370	Choke Coil 100μH				1
C801	CC1 0 2500 ZG00C	Ceramic	0.001μF	50V	+80,-20%	1
C802	CC1 0 2500 ZG00C	Ceramic	0.001μF	50V	+80,-20%	1
C803	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C804	CC3 3 0500 KD00C	Ceramic	33pF	50V	±10%	1
C805	CC3 3 0500 KD00C	Ceramic	33pF	50V	±10%	1
C806	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C807	CM1 0 2500 M00SV	Mylar	0.001μF	50V	±20%	1
C808	CM1 0 2500 M00SV	Mylar	0.001μF	50V	±20%	1
C809	CP2 2 1101 J003V	Polypropylen	220pF	100V	±5%	1
C810	CP2 2 1101 J003V	Polypropylen	220pF	100V	±5%	1
C811	CD2 2 6160 0001V	Electrolytic	22μF	16V		1

PARTS LIST (Continued)

Ref. No.	Part No.	Description	Q'ty
C812	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C813	CD2 2 6160 0001V	Electrolytic 22μF 16V	1
C814	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C815	CD4 7 6160 0001V	Electrolytic 47μF 16V	1
C816	CC1 0 2500 ZG00C	Ceramic 0.001μF 50V +80,-20%	1
C817	CD2 2 6160 0001V	Electrolytic 22μF 16V	1
C818	CD2 2 6160 0001V	Electrolytic 22μF 16V	1
C819	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C820	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C821	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C822	CD2 2 6160 0001V	Electrolytic 22μF 16V	1
D802	205 5 9040 44210	Diode, DS 442	1
IC801	208 5 2486 40218	IC, LM 6402 A 181	1
IC802	206 5 2661 21110	IC, LB 1211	1
IC803	4 2069 72600	IC, MSM 4013 RS	1
IC804	4 2039 71260	IC, HD 74 LS 164	1
IC805	4 2069 72790	IC, MSM 4584 RS	1
IC806	4 2069 72610	IC, MSM 4023 RS	1
IC807	4 2069 72660	IC, MSM 4094 RS	1
IC808	4 2069 72340	IC, MSM 4011 BRS	1
IC809	4 2069 72600	IC, MSM 4013 RS	1
Q801	203 5 5000 53650	Transistor, 2SC 536 E,F	1
Q802	203 5 4580 69850	Transistor, 2SB 698	1
Q803	203 5 4580 69850	Transistor, 2SB 698	1
Q804	203 5 4580 69850	Transistor, 2SB 698	1
Q805	203 5 4580 69850	Transistor, 2SB 698	1
Q806	203 5 5000 53650	Transistor, 2SC 536 E,F	1
R801	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R802	RD2 2 3161 JH000	Carbon 22kΩ 1/6W ±5%	1
R803	RD2 2 3161 JH000	Carbon 22kΩ 1/6W ±5%	1
R804	RD1 0 4161 JH000	Carbon 100kΩ 1/6W ±5%	1
R805	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R806	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R807	RD2 7 4161 JH000	Carbon 270kΩ 1/6W ±5%	1
R808	RD2 2 3161 JH000	Carbon 22kΩ 1/6W ±5%	1
R809	RD2 2 3161 JH000	Carbon 22kΩ 1/6W ±5%	1
R810	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R811	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R812	RD5 6 0161 JH000	Carbon 56Ω 1/6W ±5%	1
R813	RD2 2 2161 JH000	Carbon 2.2kΩ 1/6W ±5%	1
R814	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R815	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R816	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R817	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1
R818	RD1 0 2161 JH000	Carbon 1kΩ 1/6W ±5%	1
R819	RD1 0 2161 JH000	Carbon 1kΩ 1/6W ±5%	1
R820	RD1 0 2161 JH000	Carbon 1kΩ 1/6W ±5%	1
R821	RD1 0 2161 JH000	Carbon 1kΩ 1/6W ±5%	1
R822	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R823	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R824	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R825	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R826	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R827	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R828	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R829	RD4 7 0161 JH000	Carbon 47Ω 1/6W ±5%	1
R830	RD1 0 5161 JH000	Carbon 1MΩ 1/6W ±5%	1
R831	RD1 0 4161 JH000	Carbon 100kΩ 1/6W ±5%	1
R832	RD2 2 3161 JH000	Carbon 22kΩ 1/6W ±5%	1
R833	RD4 7 2161 JH000	Carbon 4.7kΩ 1/6W ±5%	1
R834	RD1 0 3161 JH000	Carbon 10kΩ 1/6W ±5%	1

PROGRAME MICOM P.C.B. ASSY

Ref. No.	Part No.	Description	Q'ty
	141 0 1939 00230	Programe Micom P.C.B. Assy	1
RA601	4 2219 70330	Resistor 2.2kΩ x7 ±5%	1
RA602	4 2219 70350	Resistor 22kΩ x11 ±5%	1
	4 2252 00090	CSB400P	1
	4 2369 71452	Connector 6P	1
	4 2369 71881	Connector 8P	1
CN13	4 2359 76220	Connector Assy	1
CN14	4 2359 76221	Connector Assy	1
CN16	4 2359 76222	Connector Assy	1
CN18	4 2359 76224	Connector Assy	1
CN19	4 2359 76225	Connector Assy	1
CN20	4 2359 76226	Connector Assy	1
L601	4 2532 00370	Choke Coil 100μH	1
C601	CM1 0 4500 J00TV	Mylar 0.1μF 50V ±5%	1
C602	CM1 0 4500 J00TV	Mylar 0.1μF 50V ±5%	1
C603	CD1 0 6160 0002V	Electrolytic 10μF 16V	1
C604	CD1 0 6160 0002V	Electrolytic 10μF 16V	1
C605	CD3 3 5500 0002V	Electrolytic 3.3μF 50V	1
C606	CD3 3 5500 0002V	Electrolytic 3.3μF 50V	1
C607	CP2 2 1101 J003V	Polypropylen 220pF 100V ±5%	1
C608	CP2 2 1101 J003V	Polypropylen 220pF 100V ±5%	1
C609	CD1 0 6160 0002V	Electrolytic 10μF 16V	1
C610	CD1 0 6160 0002V	Electrolytic 10μF 16V	1
C611	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C612	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C613	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C614	CD2 2 663A 0002V	Electrolytic 22μF 6.3V	1
C615	CD2 2 663A 0002V	Electrolytic 22μF 6.3V	1
C616	CD2 2 663A 0002V	Electrolytic 22μF 6.3V	1
C617	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C618	CD2 2 663A 0002V	Electrolytic 22μF 6.3V	1
C619	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C620	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C621	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C622	CC4 7 3500 ZG00C	Ceramic 0.047μF 50V +80,-20%	1
C623	CD1 0 5500 0002V	Electrolytic 1μF 50V	1
C624	CD1 0 5500 0002V	Electrolytic 1μF 50V	1
C625	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C626	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C627	CC1 0 3500 ZG00C	Ceramic 0.01μF 50V +80,-20%	1
C629	CC2 2 3500 ZG00C	Ceramic 0.022μF 50V +80,-20%	1
C630	CC1 2 2500 KE001	Ceramic 1200pF 50V ±10%	1
D601	202 5 1420 00128	Diode, GMA 01	1
D602	202 5 1420 00128	Diode, GMA 01	1
D603	202 5 1420 00128	Diode, GMA 01	1
D604	202 5 1420 00128	Diode, GMA 01	1
D605	202 5 1420 00128	Diode, GMA 01	1
D606	202 5 1420 00128	Diode, GMA 01	1
D607	202 5 1420 00128	Diode, GMA 01	1
IC601	208 5 2496 40218	IC, LM 6402 A 182	1
IC602	206 5 9517 80010	IC, LC 7800	1
IC603	206 5 9517 80010	IC, LC 7800	1
IC604	206 5 2661 21110	IC, LB 1211	1
IC605	4 2069 72500	IC, MSM 4556 RS	1
IC606	4 2069 72340	IC, MSM 4011 BRS	1
IC607	4 2069 72340	IC, MSM 4011 BRS	1
IC608	4 2069 72620	IC, MSM 4030 RS	1
IC609	4 2069 72330	IC, MSM 4001 BRS	1
IC610	4 2069 72530	IC, MSM 4049 RS	1
IC611	4 2069 72330	IC, MSM 4001 BRS	1
Q601	203 5 4580 69850	Transistor, 2SB 698	1
Q602	203 5 4580 69850	Transistor, 2SB 698	1
Q603	203 5 4580 69850	Transistor, 2SB 698	1

PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
Q604	203 5 4580 69850	Transistor, 2SB 698				1
Q605	203 5 1313 40010	Transistor, 2SC 3400				1
Q606	203 5 1221 34510	Transistor, 2SA 1345				1
Q607	203 5 1313 40010	Transistor, 2SC 3400				1
Q608	203 5 1221 34510	Transistor, 2SA 1345				1
R601	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R602	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R603	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R604	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R605	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R606	RD8 2 4161 JH000	Carbon	820kΩ	1/6W	±5%	1
R607	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R608	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R609	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R610	RD8 2 4161 JH000	Carbon	820kΩ	1/6W	±5%	1
R612	RD2 2 0161 JH000	Carbon	22Ω	1/6W	±5%	1
R613	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R614	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R615	RD4 7 4161 JH000	Carbon	470kΩ	1/6W	±5%	1
R616	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R617	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R618	RD1 2 4161 JH000	Carbon	120kΩ	1/6W	±5%	1
R619	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R620	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R621	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R622	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R623	RD4 7 3161 JH000	Carbon	47kΩ	1/6W	±5%	1
R624	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R625	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R626	RD4 7 3161 JH000	Carbon	47kΩ	1/6W	±5%	1
R627	RD4 7 4161 JH000	Carbon	470kΩ	1/6W	±5%	1
R628	RD4 7 2161 JH000	Carbon	4.7kΩ	1/6W	±5%	1
R629	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R630	RD8 2 3161 JH000	Carbon	82kΩ	1/6W	±5%	1
R632	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R633	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R634	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1

POWER SUPPLY & INTERFACE P.C.B. ASSY

Ref. No.	Part No.	Description				Q'ty
	141 0 1939 00241	Power Supply & Interface P.C.B. Assy				1
F01 ⚠	4 2349 70150	Fuse T315mA				1
F02 ⚠	4 2349 70360	Fuse T1.25A				3
F03 ⚠	4 2349 70360	Fuse T1.25A				3
F04 ⚠	4 2349 70360	Fuse T1.25A				3
⚠	4 2352 00200	Fuse Holder				8
CN06	4 2369 73670	Plug 3P				1
	4 2369 73676	Plug 7P (CN04,08,10)				3
CN18	4 2369 73678	Plug 10P				1
CN21	4 2369 73690	Plug 9P				1
	4 2359 76668	Connector 3P Assy				2
	4 2369 73781	Pin 1P				7
	4 2369 73930	Plug 7P				1
	4 2369 73676	Plug 7P				2
	4 2369 74230	Plug 7P				1
VR01	4 2229 74270	Semi Fixed 100k-B				1
VR02	4 2229 74270	Semi Fixed 100k-B				1
VR03	4 2229 74300	Semi Fixed 22k-B				1
VR04	4 2229 74300	Semi Fixed 22k-B				1
C01	4 2239 71220	Electrolytic	3300μF	25V		1
C02	4 2239 71220	Electrolytic	3300μF	25V		1
C03	4 2239 71270	Electrolytic	10000μF	16V		1
C04	CD1 0 8350 0001V	Electrolytic	1000μF	35V		1
C05 ⚠	CK2 2 4101 K000V	Mylar	0.22μF	100V	±10%	1
C06 ⚠	CK2 2 4101 K000V	Mylar	0.22μF	100V	±10%	1
C07 ⚠	CK2 2 4101 K000V	Mylar	0.22μF	100V	±10%	1
C08 ⚠	CK2 2 4101 K000V	Mylar	0.22μF	100V	±10%	1
C09 ⚠	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C10 ⚠	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C11 ⚠	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C12 ⚠	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C13 ⚠	4 2232 00430	Ceramic	0.01μFx2	250V		1
C14 ⚠	4 2232 00430	Ceramic	0.01μFx2	250V		1
C15	CD2 2 7250 0001V	Electrolytic	220μF	25V		1
C16	CD1 0 7250 0001V	Electrolytic	100μF	25V		1
C17	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C18	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C19	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C20	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C21	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C22	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
C23	CD1 0 6160 0001V	Electrolytic	10μF	16V		1
C24	CD1 0 6160 0001V	Electrolytic	10μF	16V		1
C25	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C26	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C27	CC5 6 2500 KE00C	Ceramic	0.0056μF	50V	±10%	1
C28	CC5 6 2500 KE00C	Ceramic	0.0056μF	50V	±10%	1
C29	CC5 6 2500 KE00C	Ceramic	0.0056μF	50V	±10%	1
C30	CC5 6 2500 KE00C	Ceramic	0.0056μF	50V	±10%	1
C31	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
D01 ⚠	202 5 2560 02015	Bridge Diode, DBA 20 B				1
D02 ⚠	202 5 2560 02015	Bridge Diode, DBA 20 B				1
D03 ⚠	202 5 4610 01010	Bridge Diode, DBA 10 B				1
D04	202 5 2470 13540	Diode, DS 135 D				1
D05	202 5 2470 13540	Diode, DS 135 D				1
D06	202 5 2470 13540	Diode, DS 135 D				1
D07	202 5 3210 09113	Zener Diode, GZA 9.1 Z				1
D08	205 5 9040 44210	Diode, DS 442				1
D09	205 5 9040 44210	Diode, DS 442				1
IC01	4 2069 70490	IC, MSM 4081				1
IC02	4 2069 72630	IC, MSM 4040 RS				1
IC03	4 2069 72530	IC, MSM 4049 RS				1
IC04	4 2069 72340	IC, MSM 4011 BRS				1
IC05	4 2069 72590	IC, MSM 4012 RS				1
IC06	4 2069 72340	IC, MSM 4011 BRS				1
IC07	4 2069 72340	IC, MSM 4011 BRS				1
IC08	4 2069 72530	IC, MSM 4049 RS				1
IC09	4 2069 72340	IC, MSM 4011 BRS				1
IC10	IJJ - NJM072D-E	IC, NJM 072D E				1
IC11	4 2069 72550	IC, NJM 78 M 12				1
Q01	203 5 7230 60850	Transistor, 2SA 608 E,F				1
Q02	203 5 6840 56050	Transistor, 2SB 560 E,F				1
R01	RD1 5 3161 JH000	Carbon	15kΩ	1/6W	±5%	1
R02	RD1 5 4161 JH000	Carbon	150kΩ	1/6W	±5%	1
R03	RD8 2 3161 JH000	Carbon	82kΩ	1/6W	±5%	1
R04	RD1 2 3251 JM000	Carbon	12kΩ	1/4W	±5%	1
R05	RD3 9 1251 JS000	Carbon	390Ω	1/4W	±5%	1
R06	RD3 3 1251 JS000	Carbon	330Ω	1/4W	±5%	1
R07	RD1 5 3251 JM000	Carbon	15kΩ	1/4W	±5%	1
R08	RD8 2 2161 JH000	Carbon	8.2kΩ	1/6W	±5%	1
R09	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R10	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R11	RD4 7 2161 JH000	Carbon	4.7kΩ	1/6W	±5%	1
R12	RD4 7 2161 JH000	Carbon	4.7kΩ	1/6W	±5%	1
R13	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R14	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R15	RD2 2 3251 JM000	Carbon	22kΩ	1/4W	±5%	1
R16	RD2 2 3251 JM000	Carbon	22kΩ	1/4W	±5%	1

PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
R17	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R18	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R19	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R20	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R21	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R22	RD1 2 3161 JH000	Carbon	12kΩ	1/6W	±5%	1
R23	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R24	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R25	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R26	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R27	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R28	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R29	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R30	RD1 0 3251 JM000	Carbon	10kΩ	1/4W	±5%	1
R31	RD1 0 3251 JM000	Carbon	10kΩ	1/4W	±5%	1
R32	RD1 0 3251 JM000	Carbon	10kΩ	1/4W	±5%	1
R33	RD1 0 3251 JM000	Carbon	10kΩ	1/4W	±5%	1

DECODER P.C.B. ASSY

Ref. No.	Part No.	Description				Q'ty
	141 0 1939 00250	Decoder P.C.B. Assy				1
	4 2259 70260	Crystal				1
	4 2359 76216	Connector Assy				1
	4 2359 76217	Connector Assy				1
	4 2369 71441	Connector 6P Side				1
	4 2369 71452	Connector 6P				2
	4 2369 73674	Plug 5P				1
	4 2369 73675	Plug 6P				1
RY101	4 2329 70310	Reed Relay				1
RY102	4 2329 70310	Reed Relay				1
RY103	4 2329 70320	Relay				1
S101	4 2359 76421	IC Socket 28P				1
S102	4 2359 76411	IC Socket 40P				1
S104	4 2359 76441	IC Socket 18P				1
S105	4 2359 76431	IC Socket 24P				1
VR101	4 2229 74240	Semi Fixed 200-B				1
L101	4 2589 72290	OSC Coil				1
C101	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C102	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C103	CM2 2 3500 J00SV	Mylar	0.022μF	50V	±5%	1
C104	CM2 2 3500 J00SV	Mylar	0.022μF	50V	±5%	1
C105	CC4 7 2500 KE00C	Ceramic	0.0047μF	50V	±10%	1
C106	CC4 7 2500 KE00C	Ceramic	0.0047μF	50V	±10%	1
C107	CC8 2 1500 KE00C	Ceramic	820pF	50V	±10%	1
C108	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C109	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C110	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C111	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C112	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C113	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C114	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C115	CC2 2 0500 JCH0C	Ceramic	22pF	50V	±5%	1
C116	CC2 7 0500 JCH0C	Ceramic	27pF	50V	±5%	1
C117	CD2 2 6100 0001V	Electrolytic	22μF	10V		1
C118	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C119	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C120	CC8 2 1500 KE00C	Ceramic	820pF	50V	±10%	1
C121	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C122	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C123	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C124	CA2 2 4160 X000V	Aluminum	0.22μF	16V	+40,-20%	1
C125	CA2 2 4160 X000V	Aluminum	0.22μF	16V	+40,-20%	1
C126	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C127	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1

Ref. No.	Part No.	Description				Q'ty
C128	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C129	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C130	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C131	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C132	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C133	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C134	CC1 5 2500 KE00C	Ceramic	0.0015μF	50V	±10%	1
C135	CP5 1 2500 G003V	Polypropylen	0.0051μF	50V	±2%	1
C136	CP1 5 3500 G003V	Polypropylen	0.015μF	50V	±2%	1
C137	CP2 2 2500 G003V	Polypropylen	0.0022μF	50V	±2%	1
C138	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C139	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C140	CP2 2 2500 G003V	Polypropylen	0.0022μF	50V	±2%	1
C141	CP1 2 2500 G003V	Polypropylen	0.0012μF	50V	±2%	1
C142	CD2 2 6160 0LR1V	Electrolytic	22μF	16V		1
C143	CC4 7 0500 KD00C	Ceramic	47pF	50V	±10%	1
C144	CC8 2 1500 KE00C	Ceramic	820pF	50V	±10%	1
C145	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C146	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C147	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C148	CA2 2 4160 X000V	Aluminum	0.22μF	16V	+40,-20%	1
C149	CA2 2 4160 X000V	Aluminum	0.22μF	16V	+40,-20%	1
C150	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C151	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C152	CA1 0 4160 X000V	Aluminum	0.1μF	16V	+40,-20%	1
C153	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C154	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C155	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C156	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C157	CM2 2 3500 K00SV	Mylar	0.022μF	50V	±10%	1
C158	CC1 5 2500 KE00C	Ceramic	0.0015μF	50V	±10%	1
C159	CP5 1 2500 G003V	Polypropylen	0.0051μF	50V	±2%	1
C160	CP1 5 3500 G003V	Polypropylen	0.015μF	50V	±2%	1
C161	CP2 2 2500 G003V	Polypropylen	0.0022μF	50V	±2%	1
C162	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C163	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C164	CP2 2 2500 G003V	Polypropylen	0.0022μF	50V	±2%	1
C165	CP1 2 2500 G003V	Polypropylen	0.0012μF	50V	±2%	1
C166	CD2 2 6160 0LR1V	Electrolytic	22μF	16V		1
C167	CC4 7 0500 KD00C	Ceramic	47pF	50V	±10%	1
C168	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C169	CD4 7 6100 0001V	Electrolytic	47μF	10V		1
C170	CD4 7 6250 0001V	Electrolytic	47μF	25V		1
C171	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C172	CD3 3 5500 0001V	Electrolytic	3.3μF	50V		1
C173	CD2 2 6100 0001V	Electrolytic	22μF	10V		1
C174	CC2 2 2500 KE00C	Ceramic	0.0022μF	50V	±10%	1
C175	CC2 2 2500 KE00C	Ceramic	0.0022μF	50V	±10%	1
C176	CD2 2 6100 0001V	Electrolytic	22μF	10V		1
C177	CD4 7 6160 0001V	Electrolytic	47μF	16V		1
C178	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C179	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C180	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C181	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C182	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C183	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C185	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C186	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C187	CD2 2 763A 0001V	Electrolytic	220μF	6.3V		1
C188	CD4 7 5250 0001V	Electrolytic	4.7μF	25V		1
C189	CA2 2 4100 K000V	Aluminum	0.22μF	10V	±10%	1
C190	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C191	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C192	CD1 0 5500 0001V	Electrolytic	1μF	50V		1

PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
C193	CD1 0 5500 0001V	Electrolytic	1μF	50V		1
C194	CM1 0 3500 K00SV	Mylar	0.01μF	50V	±10%	1
C195	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C197	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C198	CC3 9 1500 JD00C	Ceramic	390pF	50V	±5%	1
C199	CC3 9 1500 JD00C	Ceramic	390pF	50V	±5%	1
D101	202 5 1220 32113	Diode, SVC 321 C 2				1
D102	202 5 1220 32113	Diode, SVC 321 C 2				1
D103	202 5 3210 05612	Zener Diode, GZA 5.6 Y				1
D104	202 5 3200 03011	Zener Diode, GZA 3.0 X				1
D105	202 5 3210 05111	Zener Diode, GZA 5.1 X				1
D106	202 5 2810 44210	Diode, DS 442				1
D107	202 5 2810 44210	Diode, DS 442				1
D108	202 5 2810 44210	Diode, DS 442				1
D109	202 5 1400 00120	Diode, GMA 01 4 BT				1
D110	202 5 2810 44210	Diode, DS 442				1
D111	202 5 2810 44210	Diode, DS 442				1
D112	202 5 1400 00120	Diode, GMA 01 4 BT				1
IC101	4 2069 72520	IC, SAA 7011				1
IC102	4 2069 72510	IC, SAA 7020				1
IC103	4 2069 71980	IC, TMM 2016 P 2				1
IC104	4 2069 72470	IC, SAA 7000				1
IC105	4 2069 72460	IC, SAA 7030				1
IC106	4 2069 72450	IC, TDA 1540 D				1
IC107	4 2069 72450	IC, TDA 1540 D				1
IC108	4 2069 72430	IC, LM 833 N				1
IC109	4 2069 72430	IC, LM 833 N				1
IC110	4 2069 72440	IC, TC 40 H 000 P				1
IC111	4 2069 72530	IC, MSM 4049 RS				1
IC112	4 2069 70490	IC, MSM 4081				1
IC113	4 2069 72540	IC, MSM 4025 RS				1
IC114	4 2069 72850	HD74LS175 or MB74LS175				1
IC115	4 2069 72860	HD74LS86 or MB74LS86				1
Q101	203 5 6850 40050	Transistor, 2SD 400 E,F				1
Q102	203 5 5000 53652	Transistor, 2SC 536 E,F				1
Q103	203 5 4921 01260	Transistor, 2SD 1012 F,G				1
Q104	203 5 5000 53652	Transistor, 2SC 536 E,F				1
Q105	203 5 4921 01260	Transistor, 2SD 1012 F,G				1
Q106	203 5 5000 53652	Transistor, 2SC 536 E,F				1
Q107	203 5 4921 01260	Transistor, 2SD 1012 F,G				1
R101	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R102	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R103	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R104	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R105	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R106	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R107	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R108	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R109	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R110	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R111	RD3 9 2161 JH000	Carbon	3.9kΩ	1/6W	±5%	1
R112	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R113	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R114	RD1 2 2161 JH000	Carbon	1.2kΩ	1/6W	±5%	1
R115	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R116	RD2 7 2161 JH000	Carbon	2.7kΩ	1/6W	±5%	1
R117	RD1 0 1161 JH000	Carbon	100Ω	1/6W	±5%	1
R118	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R119	RM5 6 1161 FH000	Metal	560Ω	1/6W	±1.0pF	1
R120	RM2 7 1161 JH000	Metal	270Ω	1/6W	±5%	1
R122	RM8 2 0161 FH000	Metal	82Ω	1/6W	±1.0pF	1
R123	RM1 5 1161 FH000	Metal	150Ω	1/6W	±1.0pF	1
R124	RM1 0 2251 FH000	Metal	1kΩ	1/4W	±1.0pF	1
R125	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1

Ref. No.	Part No.	Description				Q'
R126	RM1 8 2251 FH000	Metal	1.8kΩ	1/4W	±1.0pF	
R127	RM2 2 2251 FH000	Metal	2.2kΩ	1/4W	±1.0pF	
R128	RM2 2 2251 FH000	Metal	2.2kΩ	1/4W	±1.0pF	
R129	RM1 0 3251 FH000	Metal	10kΩ	1/4W	±1.0pF	
R130	RM5 6 0251 FH000	Metal	56Ω	1/4W	±1.0pF	
R131	RD2 7 2161 JH000	Carbon	2.7kΩ	1/6W	±5%	
R132	RD1 0 1161 JH000	Carbon	100Ω	1/6W	±5%	
R133	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	
R134	RM6 2 1161 FH000	Metal	620Ω	1/6W	±1.0pF	1
R135	RM8 2 0161 FH000	Metal	82Ω	1/6W	±1.0pF	1
R136	RM1 5 1161 FH000	Metal	150Ω	1/6W	±1.0pF	1
R137	RM1 0 2251 FH000	Metal	1kΩ	1/4W	±1.0pF	1
R138	RD1 0 5161 JH000	Carbon	1MΩ	1/6W	±5%	1
R139	RM1 8 2251 FH000	Metal	1.8kΩ	1/4W	±1.0pF	1
R140	RM2 2 2251 FH000	Metal	2.2kΩ	1/4W	±1.0pF	1
R141	RM2 2 2251 FH000	Metal	2.2kΩ	1/4W	±1.0pF	1
R142	RM1 0 3251 FH000	Metal	10kΩ	1/4W	±1.0pF	1
R143	RM5 6 0251 FH000	Metal	56Ω	1/4W	±1.0pF	1
R144	RM3 3 3251 FH000	Metal	33kΩ	1/4W	±1.0pF	1
R145	RM3 3 3251 FH000	Metal	33kΩ	1/4W	±1.0pF	1
R146	RD8 2 1251 JM000	Carbon	820Ω	1/4W	±5%	1
R147	RF1 2 1501 KH000	Mold	120Ω	1/2W	±10%	1
R148	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R149	RD3 3 2161 JH000	Carbon	3.3kΩ	1/6W	±5%	1
R150	RD3 3 2251 JM000	Carbon	3.3kΩ	1/4W	±5%	1
R151	RD2 2 1251 JM000	Carbon	220Ω	1/4W	±5%	1
R152	RD2 2 1251 JM000	Carbon	220Ω	1/4W	±5%	1
R153	RD2 2 1251 JM000	Carbon	220Ω	1/4W	±5%	1
R154	RD2 2 1251 JM000	Carbon	220Ω	1/4W	±5%	1
R155	RD1 0 3251 JM000	Carbon	10kΩ	1/4W	±5%	1
R156	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R157	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R158	RD2 2 2251 JM000	Carbon	2.2kΩ	1/4W	±5%	1
R159	RD4 7 1161 JH000	Carbon	470Ω	1/6W	±5%	1
R160	RD1 5 4251 JM000	Carbon	150kΩ	1/4W	±5%	1
R161	RD2 2 2251 JM000	Carbon	2.2kΩ	1/4W	±5%	1
R162	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R163	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R164	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R165	RD2 7 3161 JH000	Carbon	27kΩ	1/6W	±5%	1
R166	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R167	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R168	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R169	RD1 5 2251 JM000	Carbon	1.5kΩ	1/4W	±5%	1

KEYBOARD SWITCH P.C.B. ASSY

	141 0 1939 00260	Keyboard Switch P.C.B. Assy	1
LED01	4 2029 72610	L.E.D., TLR 4115	1
	131 2 4208 45100	Spacer	1
	131 2 5101 23300	Spring Earth	1
SW701	4 2312 05800	Keyboard Switch	1
SW702	4 2312 05800	Keyboard Switch	1
SW703	4 2312 05800	Keyboard Switch	1
SW704	4 2312 05800	Keyboard Switch	1
SW705	4 2312 05800	Keyboard Switch	1
SW706	4 2312 05800	Keyboard Switch	1
SW707	4 2312 05800	Keyboard Switch	1
SW708	4 2312 05800	Keyboard Switch	1
SW709	4 2312 05800	Keyboard Switch	1
SW710	4 2312 05800	Keyboard Switch	1
SW711	4 2312 05800	Keyboard Switch	1
SW712	4 2312 05800	Keyboard Switch	1
SW713	4 2312 05800	Keyboard Switch	1

PARTS LIST *(Continued)*

Ref. No.	Part No.	Description				Q'ty
SW714	4 2312 05800	Keyboard Switch				1
SW715	4 2312 05800	Keyboard Switch				1
SW716	4 2312 05800	Keyboard Switch				1
SW717	4 2312 05800	Keyboard Switch				1
SW718	4 2312 05800	Keyboard Switch				1
SW719	4 2312 05800	Keyboard Switch				1
D701	4 2029 72580	L.E.D., SLR 55 MC 3				1
D702	4 2029 72580	L.E.D., SLR 55 MC 3				1
D703	4 2029 72580	L.E.D., SLR 55 MC 3				1
D704	4 2029 72580	L.E.D., SLR 55 MC 3				1
D705	4 2029 72580	L.E.D., SLR 55 MC 3				1
D706	4 2029 72580	L.E.D., SLR 55 MC 3				1
D707	4 2029 72580	L.E.D., SLR 55 MC 3				1
D708	4 2029 72580	L.E.D., SLR 55 MC 3				1
D709	4 2029 72580	L.E.D., SLR 55 MC 3				1
D710	4 2029 72580	L.E.D., SLR 55 MC 3				1
D711	4 2029 72580	L.E.D., SLR 55 MC 3				1
D712	4 2029 72580	L.E.D., SLR 55 MC 3				1
D713	4 2029 72580	L.E.D., SLR 55 MC 3				1
D714	4 2029 72580	L.E.D., SLR 55 MC 3				1
D715	4 2029 72580	L.E.D., SLR 55 MC 3				1
D716	4 2029 72580	L.E.D., SLR 55 MC 3				1
D717	4 2029 72580	L.E.D., SLR 55 MC 3				1
D718	4 2029 72580	L.E.D., SLR 55 MC 3				1
D719	4 2029 72580	L.E.D., SLR 55 MC 3				1
D720	4 2029 72580	L.E.D., SLR 55 MC 3				1
D721	4 2029 72262	L.E.D., SLR-34URC3				1
D722	4 2029 72262	L.E.D., SLR-34URC3				1
D723	4 2029 72262	L.E.D., SLR-34URC3				1
D724	4 2029 72262	L.E.D., SLR-34URC3				1
D725	4 2029 72263	L.E.D., SLR-34MC3				1
D726	4 2029 72263	L.E.D., SLR-34MC3				1
D727	4 2029 72580	L.E.D., SLR 55 MC 3				1
D728	DYY - SLR- 55URC	L.E.D., SLR 55 URC 3				1
D729	D00 - SLP- 273B-	L.E.D., SLP 273 B 01				1
D730	D00 - SLP- 273B-	L.E.D., SLP 273 B 01				1
D731	D00 - SLP- 273B-	L.E.D., SLP 273 B 01				1
D732	D00 - SLP- 273B-	L.E.D., SLP 273 B 01				1
R701	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1
R702	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1
R703	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1
R704	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1
R705	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1
R706	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1
R707	RD5 6 0161 JH000	Carbon	56Ω	1/6W	±5%	1

OPEN/CLOSE P.C.B. ASSY

Ref. No.	Part No.	Description				Q'ty
	141 0 1939 00270	Open/Close P.C.B. Assy				1
CN14	4 2369 73673	Plug 4P				1
CN07	4 2369 73676	Plug 7P				1
CN11	4 2359 76218	Connector Assy				1
CN12	4 2359 76219	Connector Assy				1
	131 2 6201 33800	Plate Heat Sink				1
VR501	4 2229 74450	Semi Fixed 220k-B				1
C501	CD1 0 6160 0001V	Electrolytic	10μF	16V		1
C502	CD2 2 5160 0001V	Electrolytic	2.2μF	16V		1
C503	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C504	CM1 0 2500 K00SV	Mylar	0.001μF	50V	±10%	1
C505	CD2 2 6160 0001V	Electrolytic	22μF	16V		1
C506	CD2 2 6160 0001V	Electrolytic	22μF	16V		1
C507	CB4 7 6160 0000V	None-polar	47μF	16V		1
C508	CD4 7 5160 0001V	Electrolytic	4.7μF	16V		1
C509	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C510	CC2 2 3500 ZG00C	Ceramic	0.022μF	50V	+80,-20%	1
C511	CC1 0 3500 ZG00C	Ceramic	0.01μF	50V	+80,-20%	1
C512	CC5 6 2500 KE00C	Ceramic	0.0056μF	50V	±10%	1
C513	CC2 7 2500 KE00C	Ceramic	0.0027μF	50V	±10%	1
D501	202 5 3160 00110	Diode, GMA 01				1
D502	202 5 3160 00110	Diode, GMA 01				1
D504	205 5 9040 44210	Diode, DS 442				1
D505	205 5 9040 44210	Diode, DS 442				1
D506	205 5 9040 44210	Diode, DS 442				1
D507	205 5 9040 44210	Diode, DS 442				1
D508	205 5 9040 44210	Diode, DS 442				1
IC501	4 2069 72590	IC, MSM 4012 RS				1
IC502	4 2069 72530	IC, MSM 4049 RS				1
IC503	4 2069 72600	IC, MSM 4013 RS				1
IC504	4 2069 70490	IC, MSM 4081				1
IC505	4 2069 72530	IC, MSM 4049 RS				1
IC506	206 5 1155 51220	IC, LA 5512 B				1
Q501	203 5 1313 40010	Transistor, 2SC 3400				1
Q502	203 5 1313 40010	Transistor, 2SC 3400				1
Q503	203 5 7350 76450	Transistor, 2SB 764 E,F				1
Q504	203 5 7350 76450	Transistor, 2SB 764 E,F				1
Q505	203 5 7340 86350	Transistor, 2SD 863 E,F				1
Q506	203 5 7340 86350	Transistor, 2SD 863 E,F				1
Q507	4 2039 71240	Transistor, 2SA 798 F				1
Q508	4 2039 71240	Transistor, 2SA 798 F				1
R501	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R502	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R504	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R505	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R506	RD1 0 4251 JM000	Carbon	100kΩ	1/4W	±5%	1
R507	RD2 2 3251 JM000	Carbon	22kΩ	1/4W	±5%	1
R508	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R509	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R510	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R511	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R512	RD1 0 3161 JH000	Carbon	10kΩ	1/6W	±5%	1
R513	RD4 7 1161 JH000	Carbon	470Ω	1/6W	±5%	1
R514	RD4 7 1251 JM000	Carbon	470Ω	1/4W	±5%	1
R515	RH2 7 A501 JZ000	Metal	2.7Ω	1/2W	±5%	1
R516	RH5 6 A501 JZ000	Metal	5.6Ω	1/2W	±5%	1
R517	RD4 7 3161 JH000	Carbon	47kΩ	1/6W	±5%	1
R518	RD4 7 3161 JH000	Carbon	47kΩ	1/6W	±5%	1
R519	RD4 7 1161 JH000	Carbon	470Ω	1/6W	±5%	1
R520	RD4 7 1161 JH000	Carbon	470Ω	1/6W	±5%	1
R521	RD4 7 1161 JH000	Carbon	470Ω	1/6W	±5%	1
R522	RD4 7 1161 JH000	Carbon	470Ω	1/6W	±5%	1
R523	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R524	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R525	RD7 5 2121 JH000	Carbon	7.5kΩ	1/8W	±5%	1
R526	RD1 0 3251 JM000	Carbon	10kΩ	1/4W	±5%	1
R527	RD1 0 4161 JH000	Carbon	100kΩ	1/6W	±5%	1
R528	RD1 0 4251 JM000	Carbon	100kΩ	1/4W	±5%	1
R529	RD1 8 1161 JH000	Carbon	180Ω	1/6W	±5%	1
R530	RD1 8 3251 JM000	Carbon	18kΩ	1/4W	±5%	1
R531	RD3 3 3161 JH000	Carbon	33kΩ	1/6W	±5%	1
R532	RD2 7 2251 JM000	Carbon	2.7kΩ	1/4W	±5%	1

LASER P.C.B. ASSY

Ref. No.	Part No.	Description	Q'ty
	141 0 1939 00280	Laser P.C.B. Assy	1
	4 2362 00770	Plug 2P (CN23,25)	3
CN11	4 2362 00900	Plug 8P	1
CN05	4 2369 73130	Connector 3P	2
CN12	4 2369 73140	Connector 4P	1

PARTS LIST (Continued)

Ref. No.	Part No.	Description				Q'ty
CN03	4 2369 73150	Connector 5P				1
CN24	4 2359 76015	Connector 3P Assy				1
L401	4 2532 00040	Choke Coil 1mH				1
VR401	4 2229 74250	Potentiometer 50k-B				1
VR402	4 2229 74260	Potentiometer 5k-B				1
C401	CM1 0 4500 J00TV	Mylar	0.1μF	50V	±5%	1
C402	CD1 0 7250 0001V	Electrolytic	100μF	25V		1
C403	CD3 3 6250 0001V	Electrolytic	33μF	25V		1
C404	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C405	CI2 2 3250 NF00R	Ceramic	0.022μF	25V	±30%	1
D401	202 5 3200 03921	Zener Diode, GZA 3.9 Y				1
D402	202 5 3160 00110	Diode, GMA 01				1
D403	202 5 3160 00110	Diode, GMA 01				1
D404	202 5 3160 00110	Diode, GMA 01				1
IC401	206 5 3266 45810	IC, LA 6458 SS				1
Q401	203 5 8570 33060	Transistor, 2SD 330 F				1
R401	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R402	RD6 8 2161 JH000	Carbon	6.8kΩ	1/6W	±5%	1
R403	RD2 2 2161 JH000	Carbon	2.2kΩ	1/6W	±5%	1
R404	RD2 2 3161 JH000	Carbon	22kΩ	1/6W	±5%	1
R405	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R406	RD1 0 2161 JH000	Carbon	1kΩ	1/6W	±5%	1
R407	RH1 0 1202 JZ000	Metal	100Ω	2W	±5%	1
R408	RD1 5 0251 JM000	Carbon	15Ω	1/4W	±5%	1
R409	RD3 3 1251 JM000	Carbon	330Ω	1/4W	±5%	1

POWER SUPPLY P.C.B. ASSY

	141 0 1939 00290	Power Supply P.C.B. Assy				1
CN21	4 2359 76227	Connector Assy				1
C51	CM1 0 4500 K00SV	Mylar	0.1μF	50V	±10%	1
C52	CD1 0 7160 0001V	Electrolytic	100μF	16V		1
C53	CM1 0 4500 K00SV	Mylar	0.1μF	50V	±10%	1
C54	CD1 0 7160 0001V	Electrolytic	100μF	16V		1
C55	CM1 0 4500 K00SV	Mylar	0.1μF	50V	±10%	1
C56	CD1 0 7100 0001V	Electrolytic	100μF	10V		1
D51	202 5 2470 13540	Diode, DS 135 D				1
D52	202 5 2470 13540	Diode, DS 135 D				1
IC51	4 2069 72570	IC, NJM 7912				1
IC52	4 2069 72560	IC, NJM 7812				1
IC53	4 2069 72580	IC, NJM 7805				1

PUSH SWITCH P.C.B. ASSY

	141 0 1939 00300	Push Switch P.C.B. Assy	1
	4 2312 01880	Keyboard Switch	1
CN23	4 2359 76451	Connector 2P Assy	1

FILTER P.C.B. ASSY

	141 0 1939 01520	Filter P.C.B. Assy	1
	4 2539 71400	RF Filter	1

Ref. No.	Part No.	Description				Q'ty

OUTPUT P.C.B. ASSY

	141 0 1939 00321	Output P.C.B. Assy				1
	4 2352 01730	Jack 3P				1
CN22	4 2359 75894	Connector 6P Assy				1
	4 2359 76290	2P Pin Jack				1
C901	CC4 7 1500 KD00C	Ceramic	470pF	50V	±10%	1
C902	CC4 7 1500 KD00C	Ceramic	470pF	50V	±10%	1
C903	CC4 7 3500 ZG00C	Ceramic	0.047μF	50V	+80,-20%	1
C904	CC1 0 3500 ZG00C	Ceramic	0.01μF	50V	+80,-20%	1
C905	CC1 0 3500 ZG00C	Ceramic	0.01μF	50V	+80,-20%	1
C906	CC1 0 3500 ZG00C	Ceramic	0.01μF	50V	+80,-20%	1
R901	RD5 6 1161 JH000	Carbon	560Ω	1/6W	±5%	1
R902	RD5 6 1161 JH000	Carbon	560Ω	1/6W	±5%	1

PICK-UP P.C.B. ASSY

	141 0 1939 00330	Pick-up P.C.B. Assy	1
CN01	4 2359 76230	Connector Assy	1
CN02	4 2359 76231	Connector Assy	1

POWER INDICATOR P.C.B. ASSY

	141 0 1939 01200	Power Indicator P.C.B. Assy	1
CN25	4 2359 76450	Connector 2P Assy	1
D01	4 2029 72770	L.E.D., 2LC 22 UR 3	1

NOTES:

1. Parts order must contain Model Number, Part Number and Description.
2. Ordering quantity of screws and resistors must be multiple of 10 pcs.

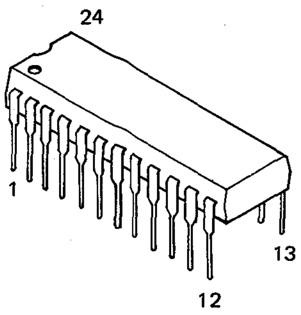
PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components in which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.

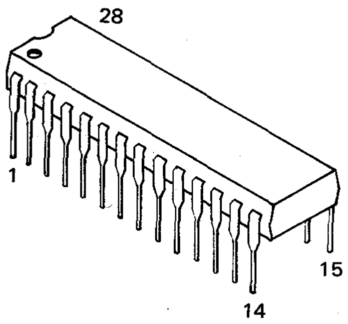
Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

SEMICONDUCTOR LEAD IDENTIFICATION

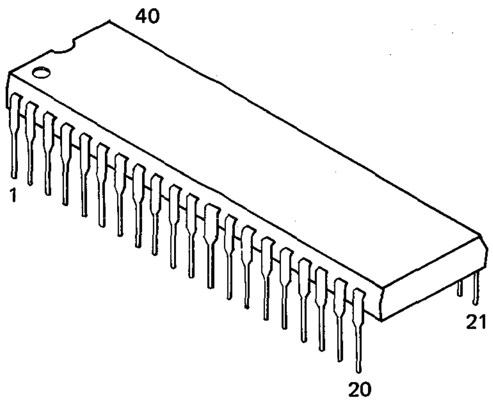
INTEGRATED CIRCUITS



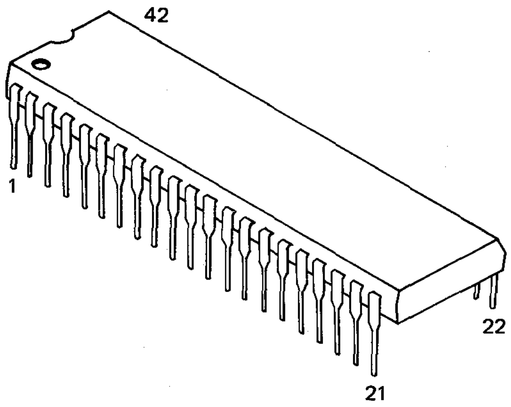
- MSM2128 20RS
- SAA7030
- TMM2016P 2



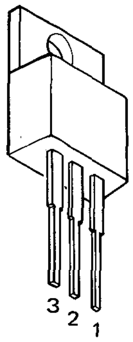
- SAA7011
- TDA1540D
- LC7800



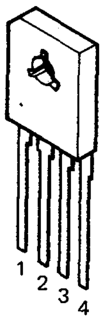
- SAA7020



- LM6402A



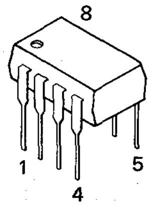
- NJM78M12
- NJM7805
- NJM7812
- NJM7912



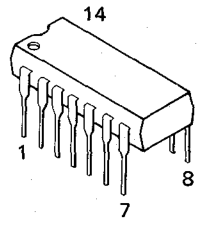
- LA5512

SEMICONDUCTOR LEAD IDENTIFICATION (Continued)

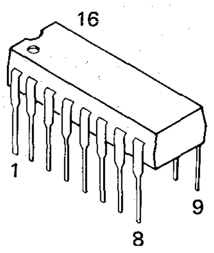
INTEGRATED CIRCUITS



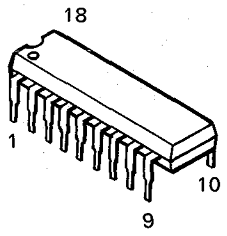
- LA6458DS
- LM833N
- NJM072DE



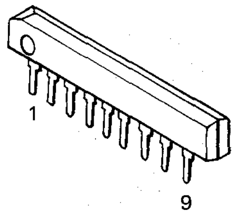
- HD74LS86
- HD74LS164
- HD74LS08P
- MSM4001BRS
- MSM4011BRS
- MSM4012RS
- MSM4013RS
- MSM4023RS
- MSM4025RS
- MSM4030RS
- MSM4081
- MSM4584RS
- NJM2058D
- TC40H000P
- TC40H004P



- MSM4556RS
- MSM4049RS
- MSM4053RS
- MSM4094RS
- LB1211
- HD74LS175
- MSM4040RS



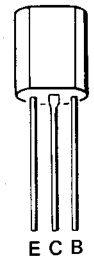
- SAA7000



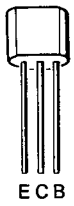
- LA6458SS

SEMICONDUCTOR LEAD IDENTIFICATION (Continued)

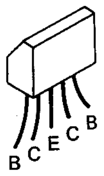
BI-POLAR TRANSISTORS



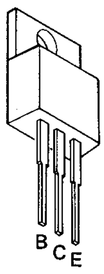
- 2SD863
- 2SB764
- 2SD400
- 2SD438
- 2SB560
- 2SB698



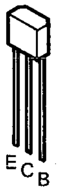
- 2SC536
- 2SA608



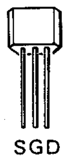
- 2SA798



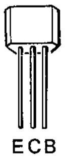
- 2SB511
- 2SD325
- 2SD330



- 2SC3400
- 2SA1345

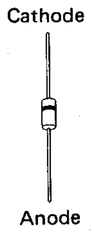


- 2SK44C

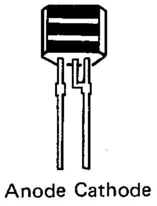


- 2SD1012

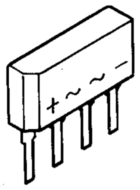
DIODES


Cathode
Anode

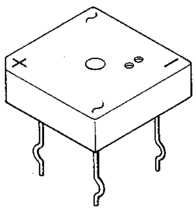
- DS135D
- DS442
- GMA01
- GZA3.0X
- GZA3.9Y
- GZA5.1X
- GZA5.6X
- GZA9.1Z


Anode Cathode

- SVC321



- DBA10B

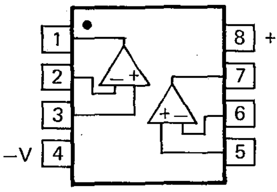


- DBA20B

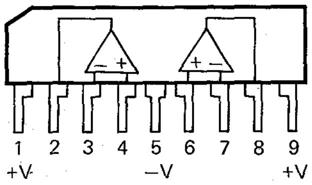
IC PIN ALLOCATION

(TOP VIEW)

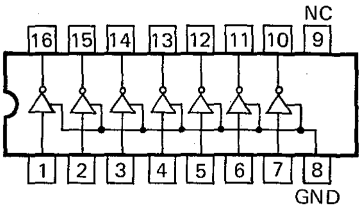
LA6458DS


1
2
3
4
5
6
7
8
+V
−V

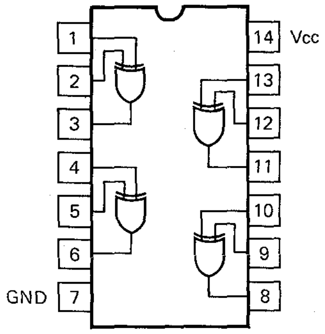
LA6458SS


1 2 3 4 5 6 7 8 9
+V
−V
+V

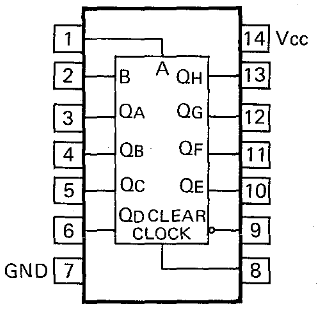
LB1211


NC
16 15 14 13 12 11 10 9
1 2 3 4 5 6 7 8
GND

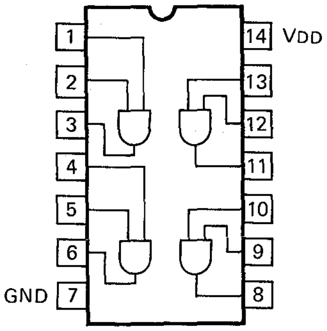
HD74LS86



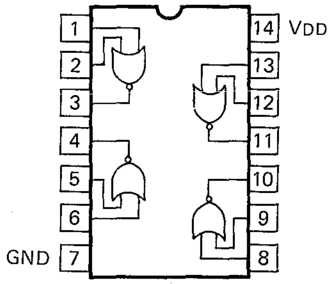
HD74LS164


Vcc
B
A
QH
QA
QG
QB
QF
QC
QE
QD
CLEAR
CLOCK
GND

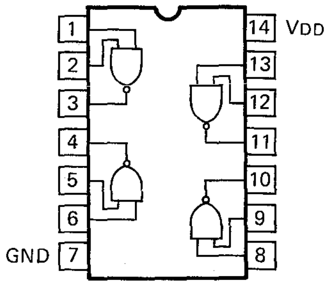
HD74LS08P



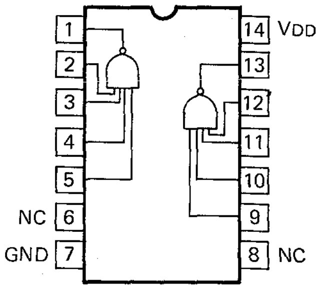
MSM4001BRS



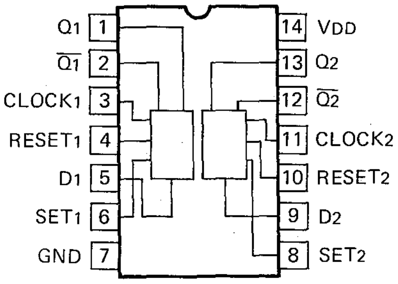
MSM4011BRS



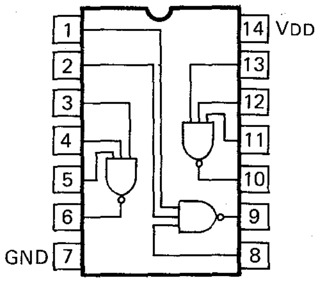
MSM4012RS


VDD
NC
GND
NC

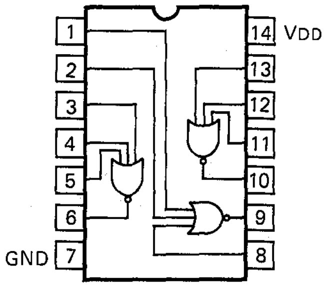
MSM4013RS


Q1
Q̅1
CLOCK1
RESET1
D1
SET1
GND
VDD
Q2
Q̅2
CLOCK2
RESET2
D2
SET2

MSM4023RS



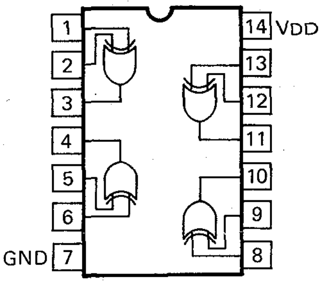
MSM4025RS



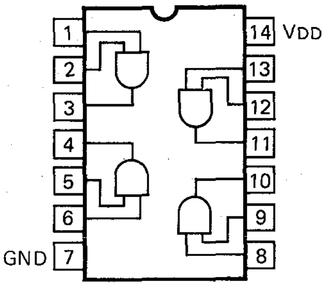
IC PIN ALLOCATION (Continued)

(TOP VIEW)

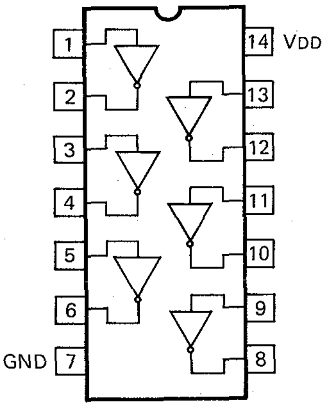
MSM4030RS


1
2
3
4
5
6
GND 7
14 VDD
13
12
11
10
9
8

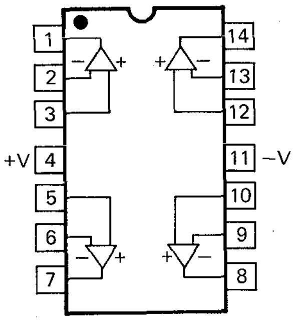
MSM4081


1
2
3
4
5
6
GND 7
14 VDD
13
12
11
10
9
8

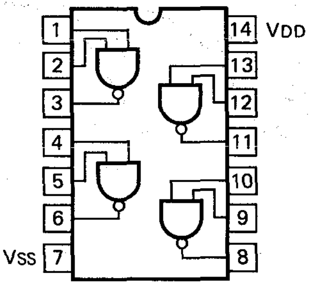
TC40H000P


1
2
3
4
5
6
GND 7
14 VDD
13
12
11
10
9
8

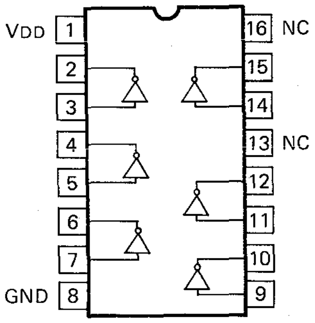
NJM2058D


1
2
3
+V 4
5
6
7
14
13
12
11 −V
10
9
8
−
+
+
−
−
+
+
−

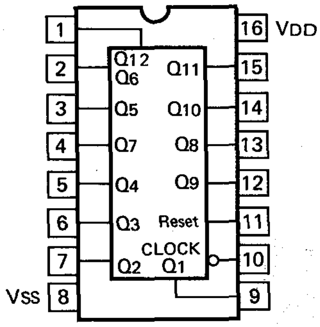
TC40H004P


1
2
3
4
5
6
Vss 7
14 VDD
13
12
11
10
9
8

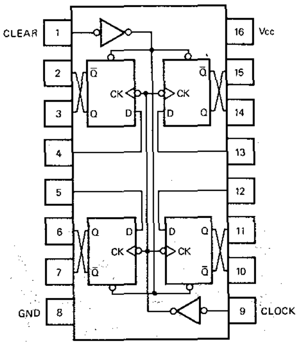
MSM4049RS


VDD 1
2
3
4
5
6
7
GND 8
16 NC
15
14
13 NC
12
11
10
9

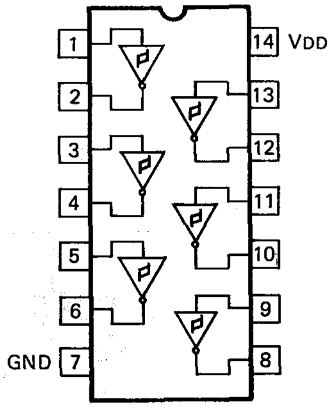
MSM4040RS

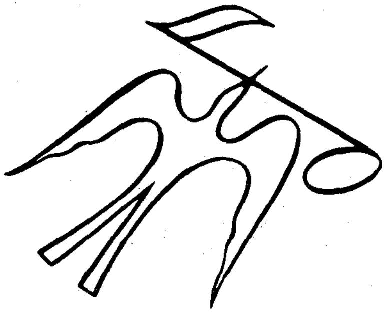

1
2
3
4
5
6
7
Vss 8
16 VDD
15
14
13
12
11
10
9
Q12
Q6
Q11
Q5
Q10
Q7
Q8
Q4
Q9
Q3
Reset
CLOCK
Q2
Q1

HD74LS175


CLEAR 1
2
3
4
5
6
7
GND 8
16 Vcc
15
14
13
12
11
10
9 CLOCK
Q̄
Q
CK
D

MSM4584RS


1
2
3
4
5
6
GND 7
14 VDD
13
12
11
10
9
8



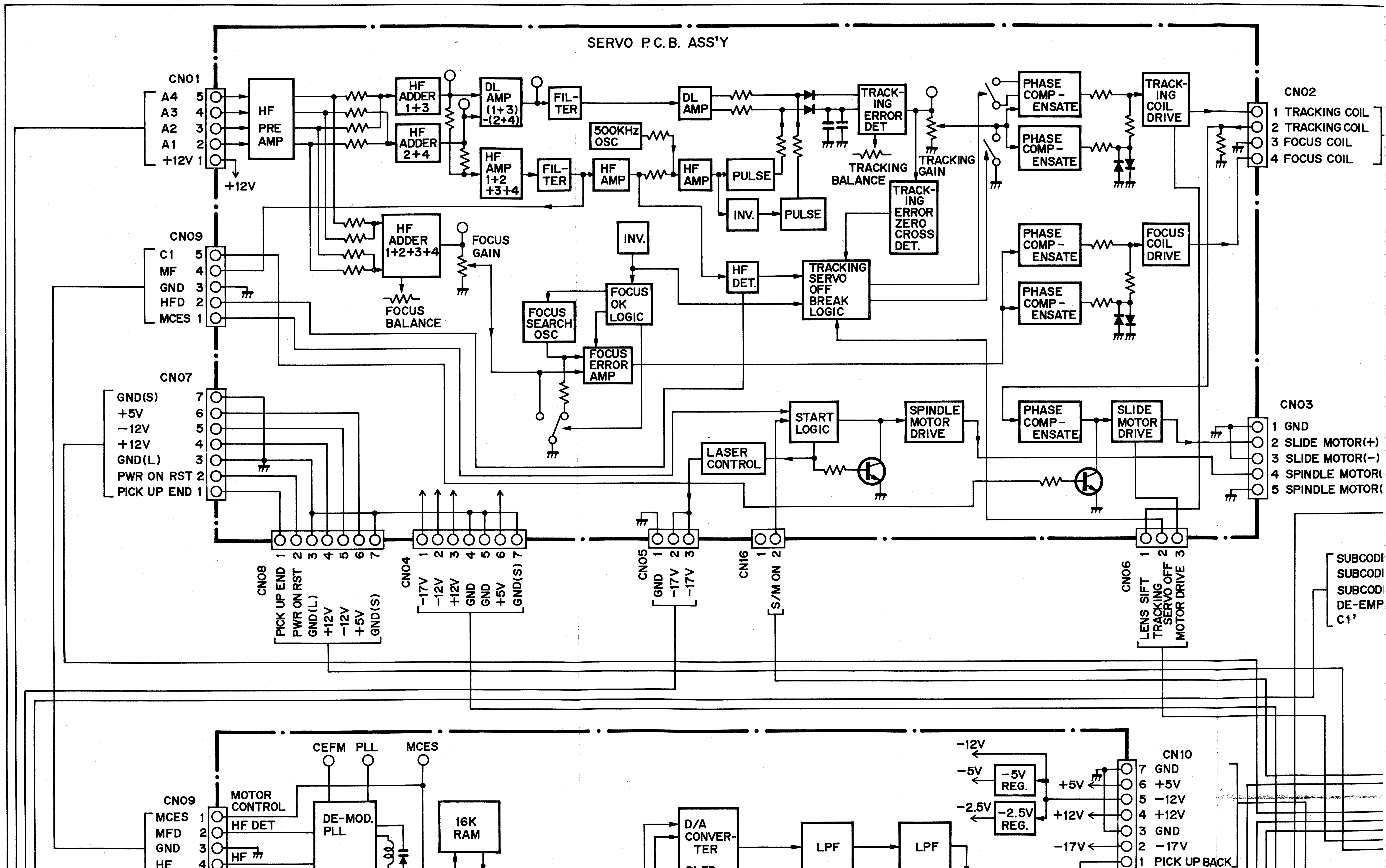
FISHER

Service/Ersatzteillager:
FISHER HiFi Europa Vertriebs-GmbH
Shönstraße 80, 8000 München 90
Telefon 0 89/23 79-1
Telex 5-212384 D
Wenden Sie sich bitte mit technischen Fragen an diese Adresse.

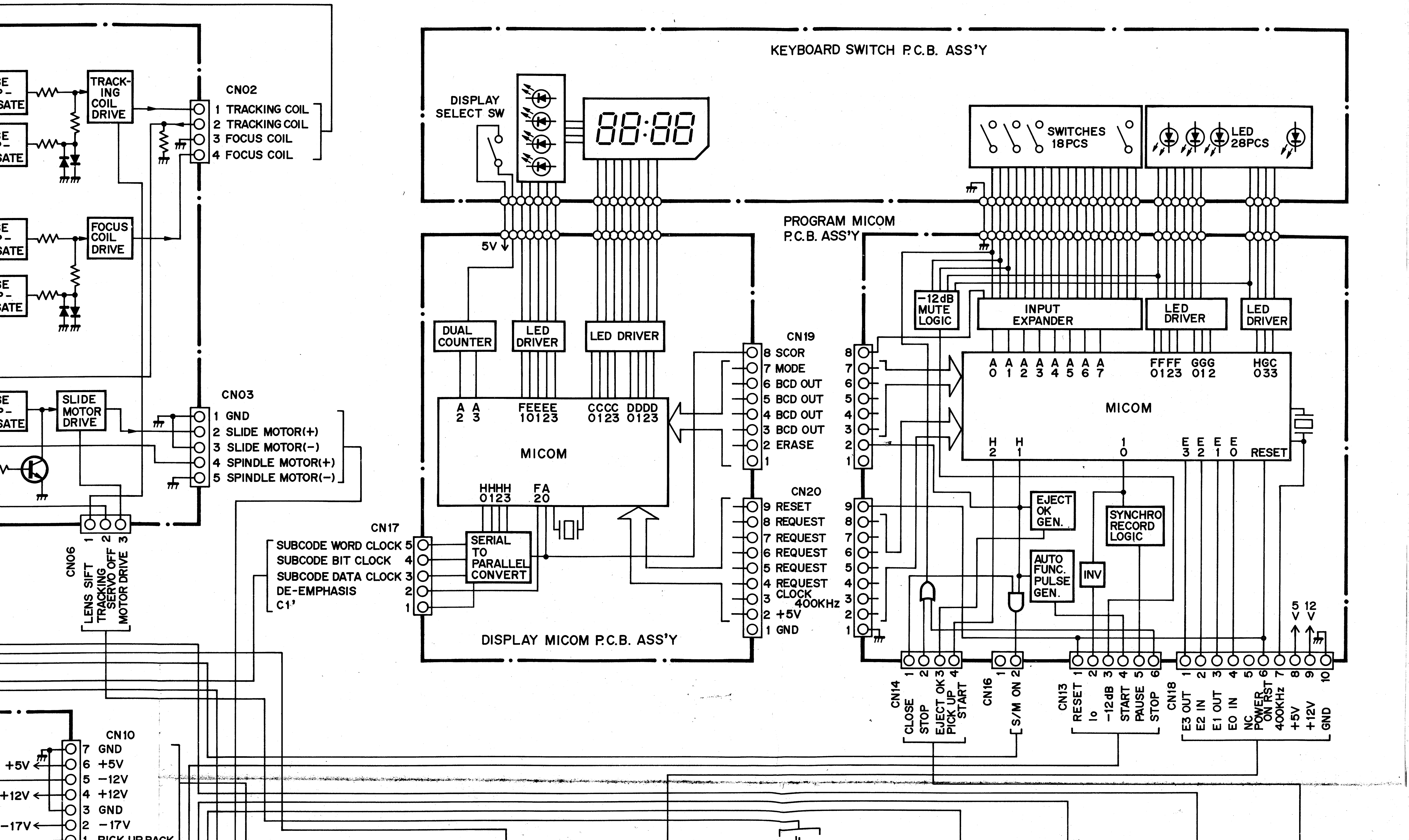
Verwaltung, Verkauf und Auslieferungslager:
FISHER HiFi Europa Vertriebs-GmbH
Truderingerstraße 13, 8000 München 80
Telefon 0 89/41 45-0
Telex 5-24665 D
5-24033 D

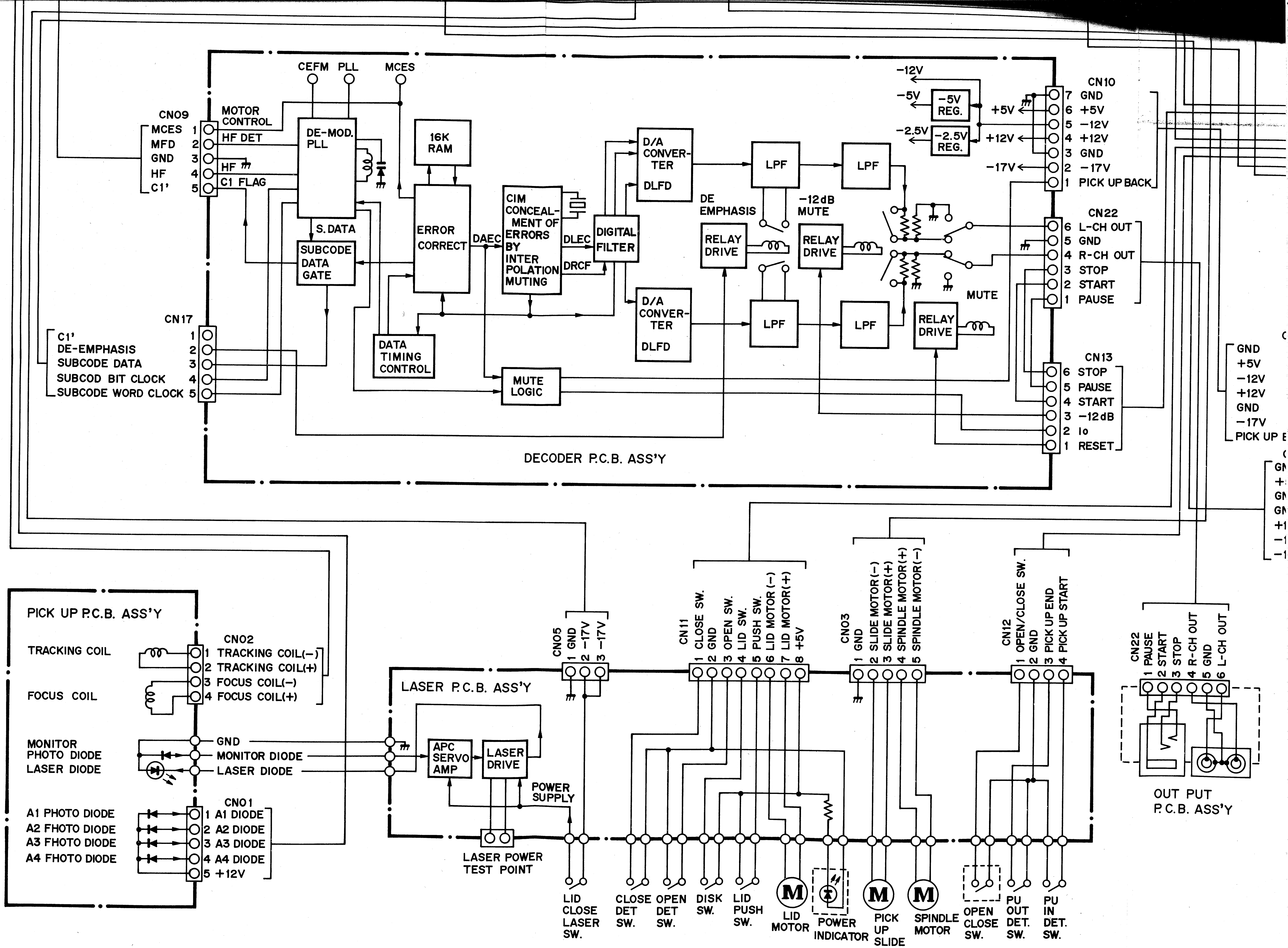
PRINTED IN JAPAN
'83/Sep. **WM-10038**

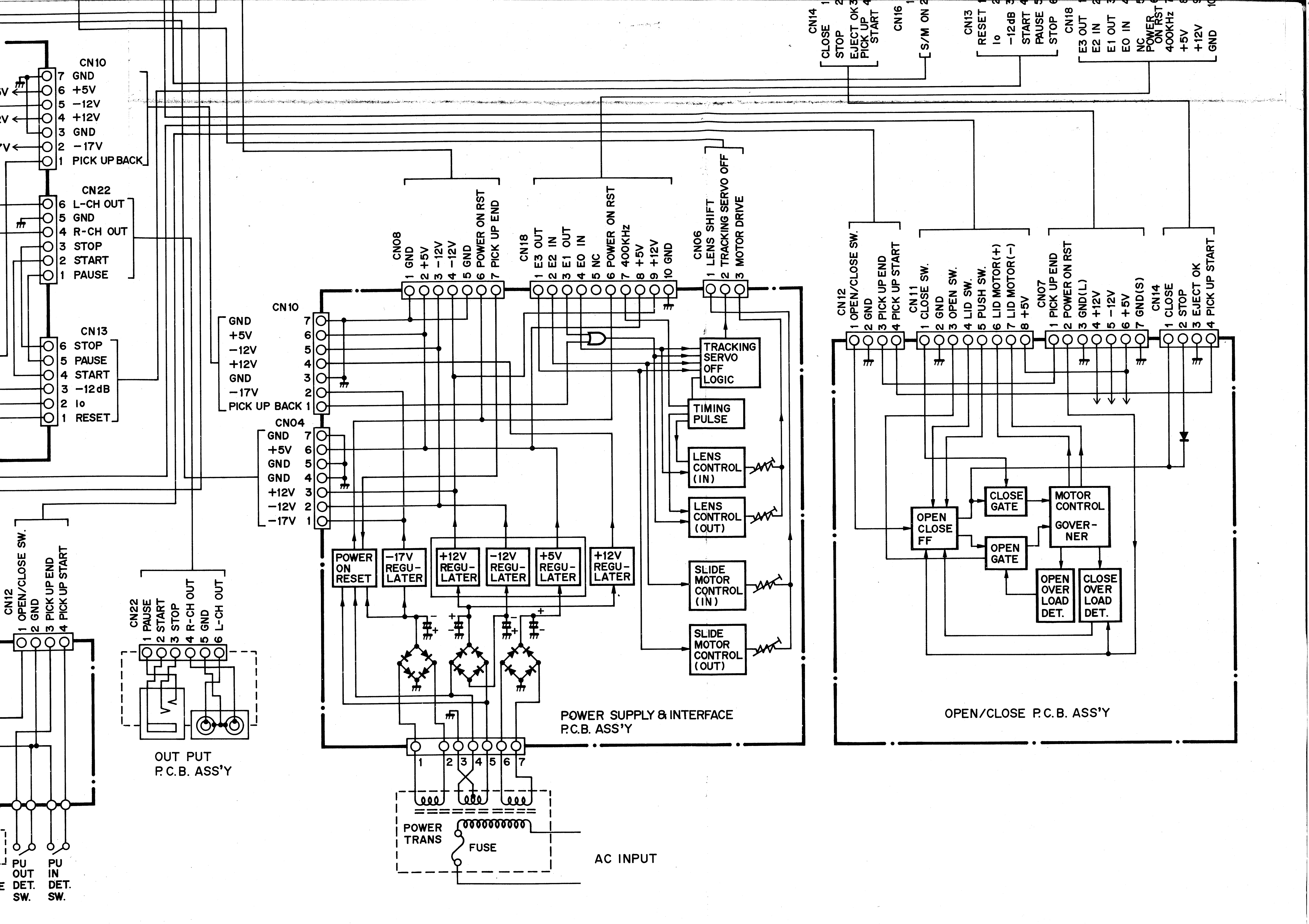
WIRING DIAGRAM (INTERCON


SERVO P.C.B. ASS'Y
CN01
A4 5
A3 4
A2 3
A1 2
+12V 1
+12V
HF PRE AMP
HF ADDER 1+3
HF ADDER 2+4
DL AMP (1+3) -(2+4)
FIL-TER
HF AMP 1+2 +3+4
FIL-TER
HF AMP
500KHz OSC
DL AMP
HF AMP
PULSE
INV.
PULSE
TRACK-ING ERROR DET
TRACKING BALANCE
TRACKING GAIN
TRACK-ING ERROR ZERO CROSS DET.
PHASE COMP-ENSATE
PHASE COMP-ENSATE
TRACK-ING COIL DRIVE
CN02
1 TRACKING COIL
2 TRACKING COIL
3 FOCUS COIL
4 FOCUS COIL
CN09
C1 5
MF 4
GND 3
HFD 2
MCES 1
HF ADDER 1+2+3+4
FOCUS GAIN
FOCUS BALANCE
INV.
FOCUS OK LOGIC
FOCUS SEARCH OSC
FOCUS ERROR AMP
HF DET.
TRACKING SERVO OFF BREAK LOGIC
PHASE COMP-ENSATE
PHASE COMP-ENSATE
FOCUS COIL DRIVE
CN07
GND(S) 7
+5V 6
−12V 5
+12V 4
GND(L) 3
PWR ON RST 2
PICK UP END 1
START LOGIC
SPINDLE MOTOR DRIVE
LASER CONTROL
PHASE COMP-ENSATE
SLIDE MOTOR DRIVE
CN03
1 GND
2 SLIDE MOTOR(+)
3 SLIDE MOTOR(−)
4 SPINDLE MOTOR(
5 SPINDLE MOTOR(
CN08
1 2 3 4 5 6 7
PICK UP END
PWR ON RST
GND(L)
+12V
−12V
+5V
GND(S)
CN04
1 2 3 4 5 6 7
−17V
−12V
+12V
GND
GND
+5V
GND(S)
CN05
1 2 3
GND
−17V
−17V
CN16
1 2
S/M ON
CN06
1 2 3
LENS SIFT
TRACKING SERVO OFF
MOTOR DRIVE
SUBCODE
SUBCODE
SUBCODE
DE-EMP
C1'
CEFM
PLL
MCES
CN09
MCES 1
MFD 2
GND 3
HF 4
MOTOR CONTROL
HF DET
HF
DE-MOD. PLL
16K RAM
D/A CONVER-TER
LPF
LPF
−12V
−5V
−5V REG.
−2.5V
−2.5V REG.
+5V
+12V
−17V
CN10
7 GND
6 +5V
5 −12V
4 +12V
3 GND
2 −17V
1 PICK UP BACK

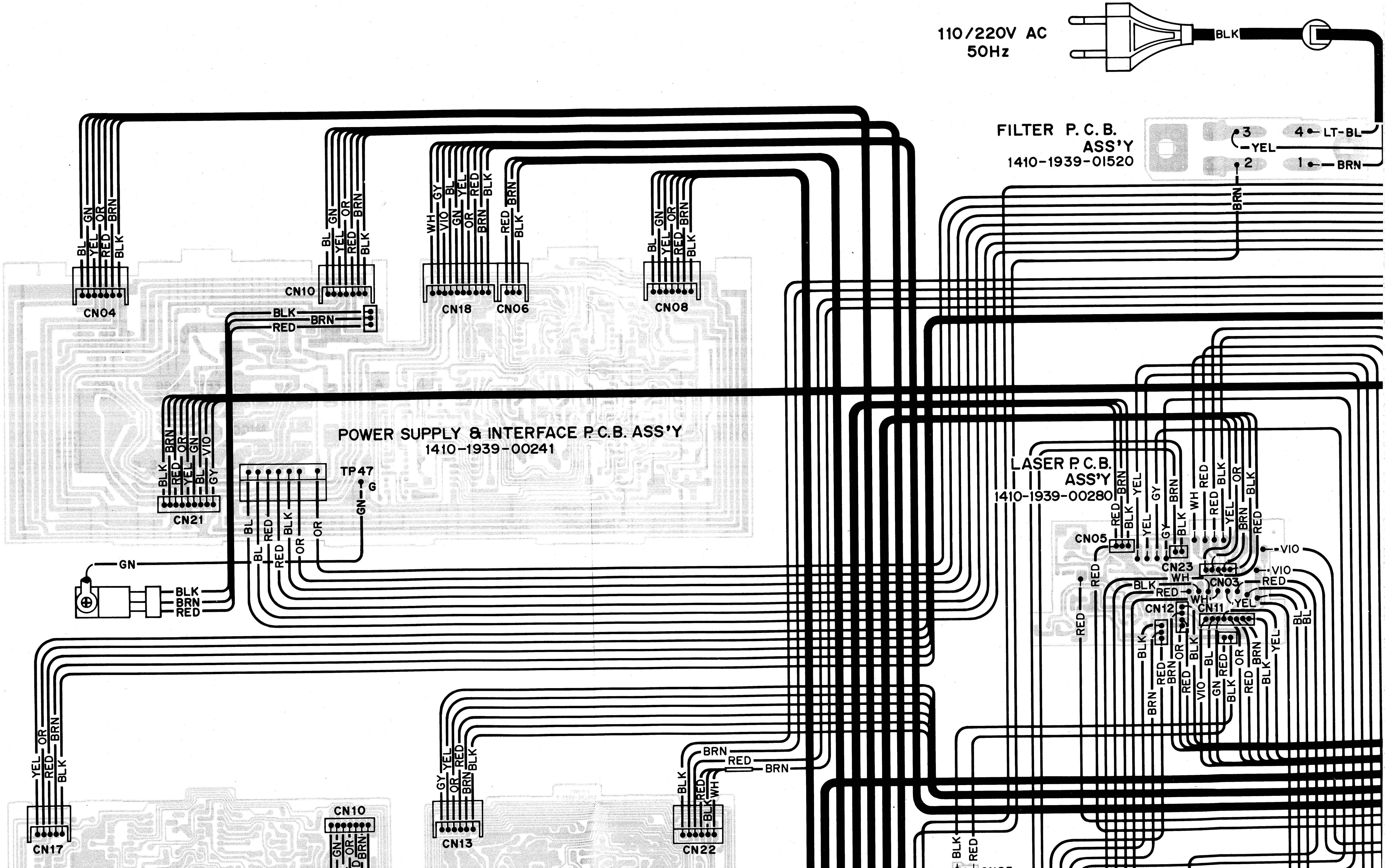
GRAM (INTERCONNECTION BETWEEN P.C.BOARDS)


KEYBOARD SWITCH P.C.B. ASS'Y
DISPLAY SELECT SW
88:88
SWITCHES 18PCS
LED 28PCS
PROGRAM MICOM P.C.B. ASS'Y
5V
DUAL COUNTER
LED DRIVER
LED DRIVER
A2 A3
FEEEE 10123
CCCC 0123 DDDD 0123
MICOM
HHHH 0123
FA 20
SERIAL TO PARALLEL CONVERT
DISPLAY MICOM P.C.B. ASS'Y
CN17
SUBCODE WORD CLOCK 5
SUBCODE BIT CLOCK 4
SUBCODE DATA CLOCK 3
DE-EMPHASIS 2
C1' 1
CN19
8 SCOR
7 MODE
6 BCD OUT
5 BCD OUT
4 BCD OUT
3 BCD OUT
2 ERASE
1
CN20
9 RESET
8 REQUEST
7 REQUEST
6 REQUEST
5 REQUEST
4 REQUEST
3 CLOCK 400KHz
2 +5V
1 GND
−12dB MUTE LOGIC
INPUT EXPANDER
LED DRIVER
LED DRIVER
A0 A1 A2 A3 A4 A5 A6 A7
FFFF 0123 GGG 012
HGC 033
MICOM
H2 H1 10
E3 E2 E1 E0
RESET
EJECT OK GEN.
SYNCHRO RECORD LOGIC
AUTO FUNC. PULSE GEN.
INV
5V 12V
CN14
1 CLOSE
2 STOP
3 EJECT OK
PICK UP
4 START
CN16
1
2 S/M ON
CN13
1 RESET
2 Io
3 −12dB
4 START
5 PAUSE
6 STOP
CN18
1 E3 OUT
2 E2 IN
3 E1 OUT
4 E0 IN
5 NC
6 POWER ON RST
7 400KHz
8 +5V
9 +12V
10 GND
TRACK-ING COIL DRIVE
FOCUS COIL DRIVE
SLIDE MOTOR DRIVE
SATE
SATE
SATE
SATE
SATE
CN02
1 TRACKING COIL
2 TRACKING COIL
3 FOCUS COIL
4 FOCUS COIL
CN03
1 GND
2 SLIDE MOTOR(+)
3 SLIDE MOTOR(−)
4 SPINDLE MOTOR(+)
5 SPINDLE MOTOR(−)
CN06
1 LENS SIFT
2 TRACKING SERVO OFF
3 MOTOR DRIVE
CN10
7 GND
6 +5V
5 −12V
4 +12V
3 GND
2 −17V
1 PICK UP BACK
+5V
+12V
−17V

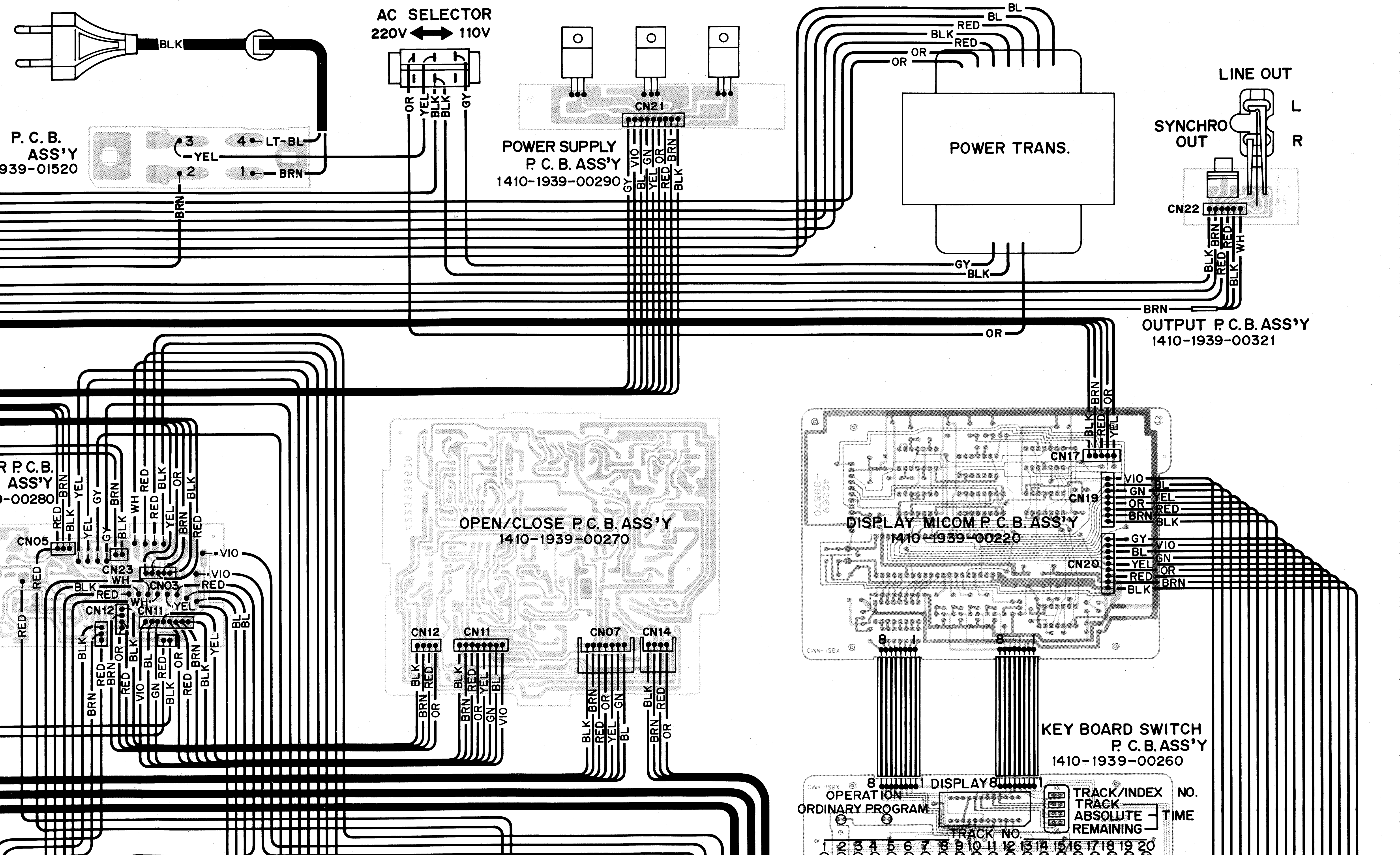

CEFM
PLL
MCES
CN09
MCES 1
MFD 2
GND 3
HF 4
C1' 5
MOTOR CONTROL
HF DET
HF
C1 FLAG
DE-MOD. PLL
S. DATA
SUBCODE DATA GATE
16K RAM
ERROR CORRECT
DAEC
CIM CONCEAL-MENT OF ERRORS BY INTER POLATION MUTING
DLEC
DRCF
DIGITAL FILTER
D/A CONVER-TER
DLFD
D/A CONVER-TER
DLFD
DE EMPHASIS
RELAY DRIVE
LPF
LPF
LPF
LPF
-12dB MUTE
RELAY DRIVE
MUTE
RELAY DRIVE
DATA TIMING CONTROL
MUTE LOGIC
CN17
C1' 1
DE-EMPHASIS 2
SUBCODE DATA 3
SUBCOD BIT CLOCK 4
SUBCODE WORD CLOCK 5
-12V
-5V
-5V REG.
-2.5V
-2.5V REG.
+5V
+12V
-17V
CN10
7 GND
6 +5V
5 -12V
4 +12V
3 GND
2 -17V
1 PICK UP BACK
CN22
6 L-CH OUT
5 GND
4 R-CH OUT
3 STOP
2 START
1 PAUSE
CN13
6 STOP
5 PAUSE
4 START
3 -12dB
2 lo
1 RESET
DECODER P.C.B. ASS'Y
GND
+5V
-12V
+12V
GND
-17V
PICK UP
GN
+
GN
GN
+1
-1
-1
PICK UP P.C.B. ASS'Y
TRACKING COIL
FOCUS COIL
CN02
1 TRACKING COIL(-)
2 TRACKING COIL(+)
3 FOCUS COIL(-)
4 FOCUS COIL(+)
MONITOR PHOTO DIODE
LASER DIODE
GND
MONITOR DIODE
LASER DIODE
A1 PHOTO DIODE
A2 FHOTO DIODE
A3 FHOTO DIODE
A4 FHOTO DIODE
CN01
1 A1 DIODE
2 A2 DIODE
3 A3 DIODE
4 A4 DIODE
5 +12V
LASER P.C.B. ASS'Y
APC SERVO AMP
LASER DRIVE
POWER SUPPLY
LASER POWER TEST POINT
CN05
1 GND
2 -17V
3 -17V
CN11
1 CLOSE SW.
2 GND
3 OPEN SW.
4 LID SW.
5 PUSH SW.
6 LID MOTOR(-)
7 LID MOTOR(+)
8 +5V
CN03
1 GND
2 SLIDE MOTOR(-)
3 SLIDE MOTOR(+)
4 SPINDLE MOTOR(+)
5 SPINDLE MOTOR(-)
CN12
1 OPEN/CLOSE SW.
2 GND
3 PICK UP END
4 PICK UP START
CN22
1 PAUSE
2 START
3 STOP
4 R-CH OUT
5 GND
6 L-CH OUT
OUT PUT P.C.B. ASS'Y
LID CLOSE LASER SW.
CLOSE DET SW.
OPEN DET SW.
DISK SW.
LID PUSH SW.
M
LID MOTOR
POWER INDICATOR
M
PICK UP SLIDE
M
SPINDLE MOTOR
OPEN CLOSE SW.
PU OUT DET. SW.
PU IN DET. SW.

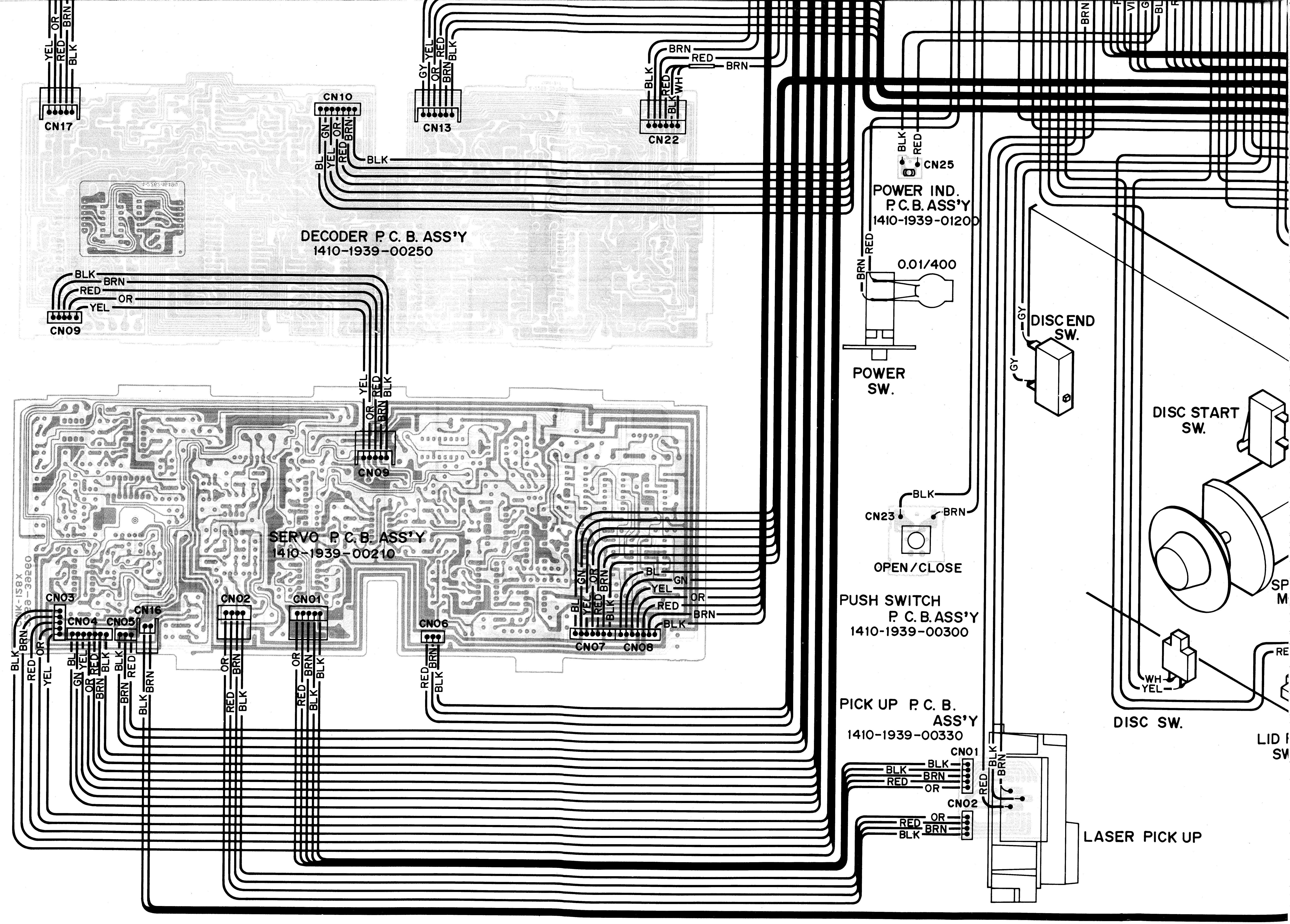

CN14
1 CLOSE
2 STOP
3 EJECT OK
4 PICK UP START
CN16
1 S/M ON
CN13
1 RESET
2 Io
3 −12dB
4 START
5 PAUSE
6 STOP
CN18
1 E3 OUT
2 E2 IN
3 E1 OUT
4 E0 IN
5 NC
6 POWER ON RST
7 400KHz
8 +5V
9 +12V
10 GND
CN10
7 GND
6 +5V
5 −12V
4 +12V
3 GND
2 −17V
1 PICK UP BACK
CN22
6 L-CH OUT
5 GND
4 R-CH OUT
3 STOP
2 START
1 PAUSE
CN13
6 STOP
5 PAUSE
4 START
3 −12dB
2 Io
1 RESET
CN08
1 GND
2 +5V
3 −12V
4 −12V
5 GND
6 POWER ON RST
7 PICK UP END
CN18
1 E3 OUT
2 E2 IN
3 E1 OUT
4 E0 IN
5 NC
6 POWER ON RST
7 400KHz
8 +5V
9 +12V
10 GND
CN06
1 LENS SHIFT
2 TRACKING SERVO OFF
3 MOTOR DRIVE
CN10
GND 7
+5V 6
−12V 5
+12V 4
GND 3
−17V 2
PICK UP BACK 1
CN04
GND 7
+5V 6
GND 5
GND 4
+12V 3
−12V 2
−17V 1
TRACKING SERVO OFF LOGIC
TIMING PULSE
LENS CONTROL (IN)
LENS CONTROL (OUT)
SLIDE MOTOR CONTROL (IN)
SLIDE MOTOR CONTROL (OUT)
POWER ON RESET
−17V REGU-LATER
+12V REGU-LATER
−12V REGU-LATER
+5V REGU-LATER
+12V REGU-LATER
POWER SUPPLY & INTERFACE P.C.B. ASS'Y
1 2 3 4 5 6 7
POWER TRANS
FUSE
AC INPUT
CN12
1 OPEN/CLOSE SW.
2 GND
3 PICK UP END
4 PICK UP START
CN11
1 CLOSE SW.
2 GND
3 OPEN SW.
4 LID SW.
5 PUSH SW.
6 LID MOTOR(+)
7 LID MOTOR(−)
8 +5V
CN07
1 PICK UP END
2 POWER ON RST
3 GND(L)
4 +12V
5 −12V
6 +5V
7 GND(S)
CN14
1 CLOSE
2 STOP
3 EJECT OK
4 PICK UP START
OPEN CLOSE FF
CLOSE GATE
OPEN GATE
MOTOR CONTROL
GOVER-NER
OPEN OVER LOAD DET.
CLOSE OVER LOAD DET.
OPEN/CLOSE P.C.B. ASS'Y
CN12
1 OPEN/CLOSE SW.
2 GND
3 PICK UP END
4 PICK UP START
CN22
1 PAUSE
2 START
3 STOP
4 R-CH OUT
5 GND
6 L-CH OUT
OUT PUT P.C.B. ASS'Y
PU OUT DET. SW.
PU IN DET. SW.
+5V
+12V
−17V
E

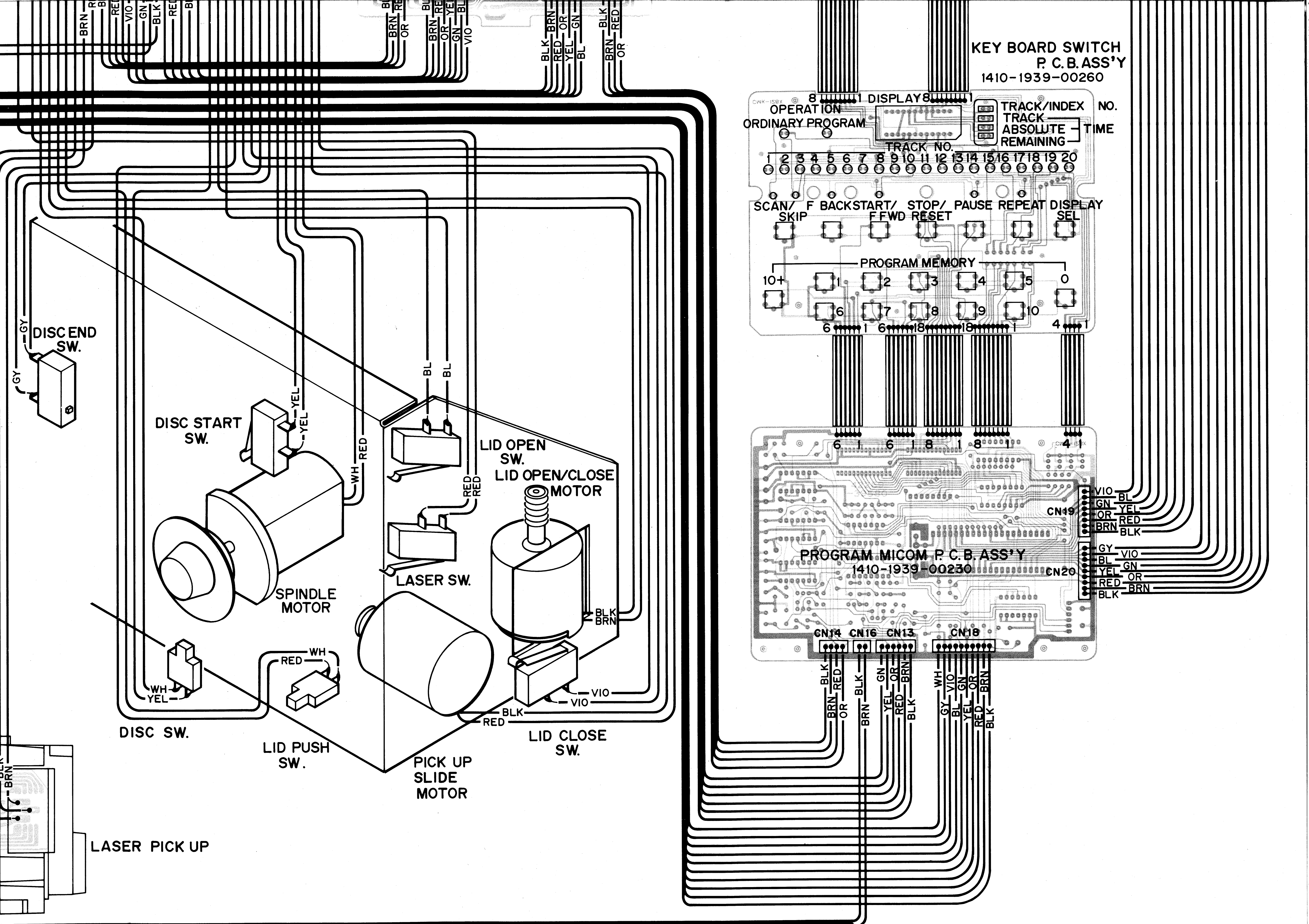
POINT TO POINT WIRIN


110/220V AC
50Hz
BLK
FILTER P. C. B.
ASS'Y
1410-1939-01520
3
4
LT-BL
YEL
2
1
BRN
CN04
CN10
CN18
CN06
CN08
BL
GN
YEL
OR
RED
BRN
BLK
WH
GY
VIO
POWER SUPPLY & INTERFACE P.C.B. ASS'Y
1410-1939-00241
TP47
G
CN21
LASER P.C.B.
ASS'Y
1410-1939-00280
CN05
CN23
CN03
CN12
CN11
CN17
CN13
CN22
CN10

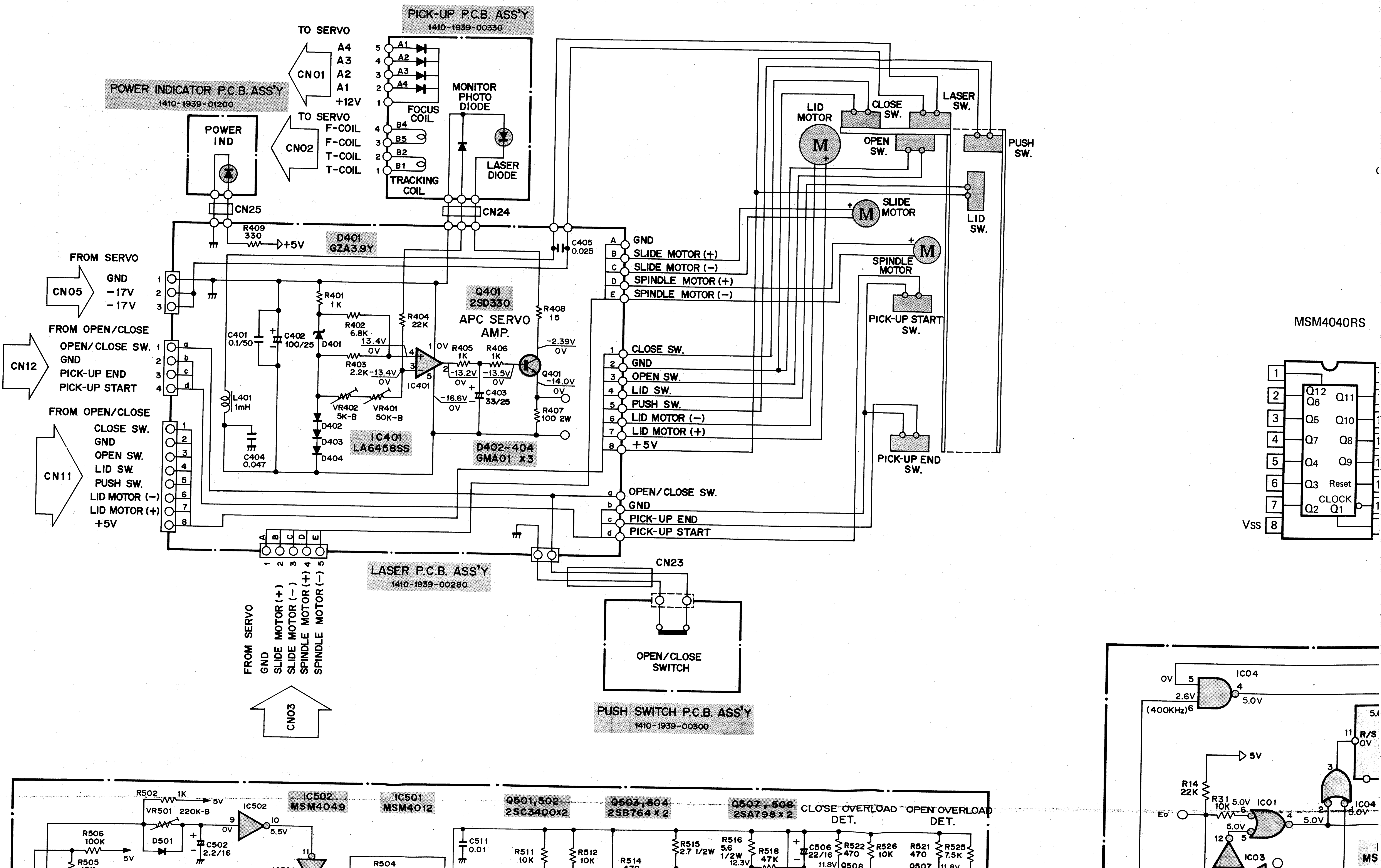
OINT WIRING DIAGRAM


AC SELECTOR
220V 110V
BLK
OR YEL BLK BLK GY
P. C. B.
ASS'Y
939-01520
3 YEL
4 LT-BL
2 BRN
1 BRN
CN21
POWER SUPPLY
P. C. B. ASS'Y
1410-1939-00290
GY VIO BL GN YEL OR RED BRN BLK
BL
BL
RED
BLK
RED
OR
OR
POWER TRANS.
GY
BLK
LINE OUT
L
R
SYNCHRO
OUT
CN22
BLK BRN RED RED BLK WH
BRN
OUTPUT P. C. B. ASS'Y
1410-1939-00321
OR
BLK BRN RED OR YEL
CN17
CN19
VIO BL GN YEL OR RED BRN BLK
CN20
GY VIO BL GN YEL OR RED BRN BLK
DISPLAY MICOM P. C. B. ASS'Y
1410-1939-00220
OPEN/CLOSE P. C. B. ASS'Y
1410-1939-00270
CN12 CN11 CN07 CN14
BLK RED BRN OR
BLK RED YEL BL BRN OR GN VIO
BLK BRN RED OR YEL GN BL
BLK RED BRN OR
R P. C. B.
ASS'Y
-00280
CN05 CN23 CN03 CN12 CN11
RED BLK YEL GY BRN WH RED BLK OR BLK BRN YEL GY BLK RED YEL BRN RED
VIO VIO RED BLK RED WH YEL BL BL
BLK RED BRN OR BLK RED VIO BL GN RED BLK OR BRN RED BLK YEL BRN
RED RED
KEY BOARD SWITCH
P. C. B. ASS'Y
1410-1939-00260
8 1 8 1
8 1 DISPLAY 8 1
OPERATION
ORDINARY PROGRAM
TRACK/INDEX NO.
TRACK
ABSOLUTE TIME
REMAINING
TRACK NO.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
CWK-158X


CN17
CN10
CN13
CN22
DECODER P.C.B. ASS'Y
1410-1939-00250
CN09
POWER IND. P.C.B. ASS'Y
1410-1939-01200
CN25
0.01/400
POWER SW.
DISC END SW.
DISC START SW.
SERVO P.C.B. ASS'Y
1410-1939-00210
CN03
CN04
CN05
CN16
CN02
CN01
CN06
CN07
CN08
CN23
OPEN/CLOSE
PUSH SWITCH P.C.B. ASS'Y
1410-1939-00300
PICK UP P.C.B. ASS'Y
1410-1939-00330
CN01
CN02
LASER PICK UP
DISC SW.
BLK
BRN
RED
OR
YEL
GY
GN
BL
WH

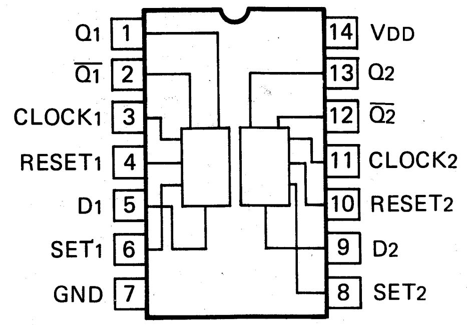

KEY BOARD SWITCH
P. C. B. ASS'Y
1410-1939-00260
OPERATION
ORDINARY PROGRAM
DISPLAY
8
1
TRACK/INDEX NO.
TRACK
ABSOLUTE
REMAINING
TIME
TRACK NO.
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
SCAN/ SKIP
F BACK
START/ F FWD
STOP/ RESET
PAUSE
REPEAT
DISPLAY SEL
PROGRAM MEMORY
10+
1 2 3 4 5 0
6 7 8 9 10
CWK-158X
CWK-151X
PROGRAM MICOM P. C. B. ASS'Y
1410-1939-00230
CN19
CN20
CN14
CN16
CN13
CN18
VIO BL GN YEL OR RED BRN BLK
GY VIO BL GN YEL OR RED BRN BLK
WH
DISC END SW.
GY
DISC START SW.
YEL
LID OPEN SW.
BL
LID OPEN/CLOSE MOTOR
LASER SW.
RED
SPINDLE MOTOR
WH
DISC SW.
LID PUSH SW.
PICK UP SLIDE MOTOR
LID CLOSE SW.
LASER PICK UP

SCHEMATIC DIAGRAM (LASER, PICK-UP, PUSH SW

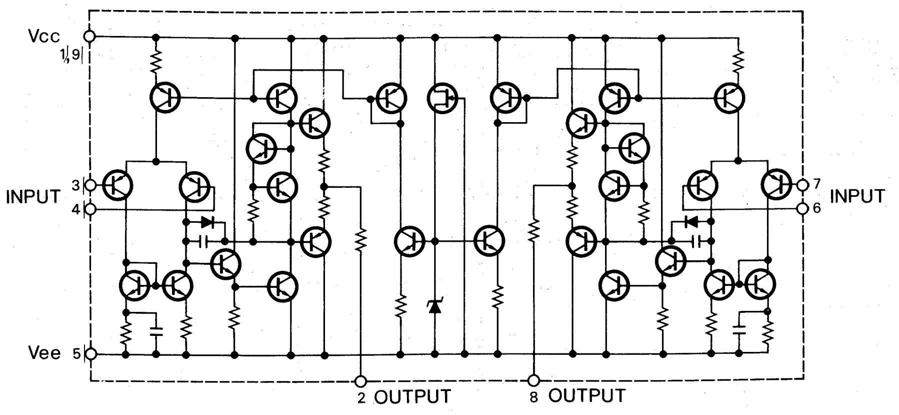

PICK-UP P.C.B. ASS'Y
1410-1939-00330
TO SERVO
CN01
A4
A3
A2
A1
+12V
A1
A2
A3
A4
MONITOR PHOTO DIODE
FOCUS COIL
TO SERVO
CN02
F-COIL
F-COIL
T-COIL
T-COIL
B4
B5
B2
B1
TRACKING COIL
LASER DIODE
POWER INDICATOR P.C.B. ASS'Y
1410-1939-01200
POWER IND
CN25
CN24
R409 330
+5V
D401 GZA3.9Y
C405 0.025
FROM SERVO
CN05
GND
−17V
−17V
R401 1K
R402 6.8K
13.4V
0V
R404 22K
Q401 2SD330
APC SERVO AMP.
R408 15
C401 0.1/50
C402 100/25
D401
R403 2.2K
−13.4V
0V
R405 1K
R406 1K
−13.2V
0V
−13.5V
0V
−2.39V
0V
Q401
−14.0V
0V
IC401
−16.6V
0V
C403 33/25
R407 100 2W
L401 1mH
VR402 5K-B
VR401 50K-B
D402
D403
D404
C404 0.047
IC401 LA6458SS
D402~404 GMA01 ×3
FROM OPEN/CLOSE
CN12
OPEN/CLOSE SW.
GND
PICK-UP END
PICK-UP START
FROM OPEN/CLOSE
CN11
CLOSE SW.
GND
OPEN SW.
LID SW.
PUSH SW.
LID MOTOR (−)
LID MOTOR (+)
+5V
A GND
B SLIDE MOTOR (+)
C SLIDE MOTOR (−)
D SPINDLE MOTOR (+)
E SPINDLE MOTOR (−)
1 CLOSE SW.
2 GND
3 OPEN SW.
4 LID SW.
5 PUSH SW.
6 LID MOTOR (−)
7 LID MOTOR (+)
8 +5V
a OPEN/CLOSE SW.
b GND
c PICK-UP END
d PICK-UP START
LID MOTOR
CLOSE SW.
LASER SW.
OPEN SW.
PUSH SW.
SLIDE MOTOR
LID SW.
SPINDLE MOTOR
PICK-UP START SW.
PICK-UP END SW.
LASER P.C.B. ASS'Y
1410-1939-00280
FROM SERVO
GND
SLIDE MOTOR (+)
SLIDE MOTOR (−)
SPINDLE MOTOR (+)
SPINDLE MOTOR (−)
CN03
CN23
OPEN/CLOSE SWITCH
PUSH SWITCH P.C.B. ASS'Y
1410-1939-00300
MSM4040RS
Q12
Q6
Q11
Q5
Q10
Q7
Q8
Q4
Q9
Q3
Reset
CLOCK
Q2
Q1
Vss
IC04
0V
2.6V
(400KHz)
5.0V
R/S
0V
+5V
R14 22K
R31 10K
5.0V
IC01
Eo
IC03
IC04
5.0V
R502 1K
5V
VR501 220K-B
IC502
5.5V
R506 100K
D501
C502 2.2/16
R505
R504
IC502 MSM4049
IC501 MSM4012
Q501,502 2SC3400×2
Q503,504 2SB764 ×2
Q507,508 2SA798 ×2
CLOSE OVERLOAD DET.
OPEN OVERLOAD DET.
C511 0.01
R511 10K
R512 10K
R514
R515 2.7 1/2W
R516 5.6 1/2W
12.3V
R518 47K
C506 22/16
11.8V
R522 470
Q508
R526 10K
R521 470
Q507
R525 7.5K
11.8V

-UP, PUSH SWITCH, OPEN/CLOSE, POWER SUPPLY & INTERFACE, POWER SUPPLY, FILTER)

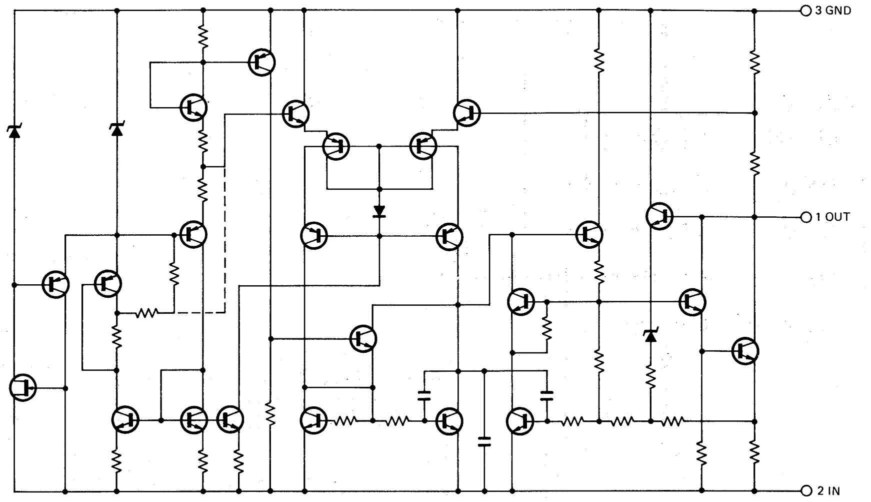
MSM4013RS


Q1 1
Q̄1 2
CLOCK1 3
RESET1 4
D1 5
SET1 6
GND 7
14 VDD
13 Q2
12 Q̄2
11 CLOCK2
10 RESET2
9 D2
8 SET2

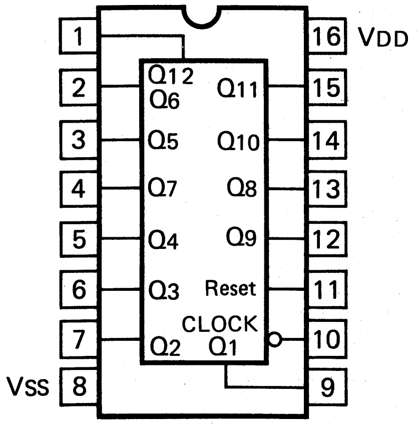
LA6458SS


Vcc
1, 9
INPUT 3
4
Vee 5
7 INPUT
6
2 OUTPUT
8 OUTPUT

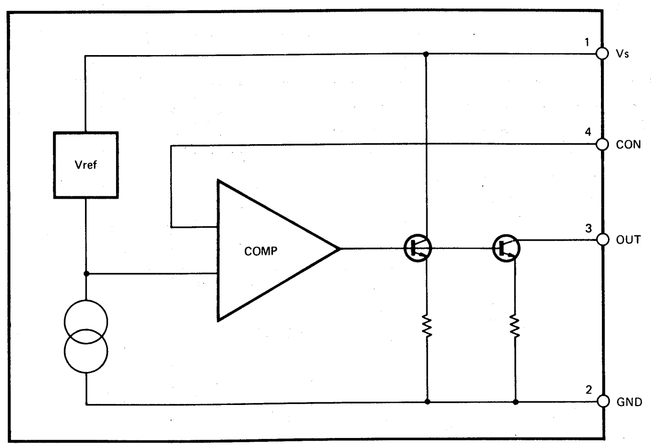
NJM7912


3 GND
1 OUT
2 IN

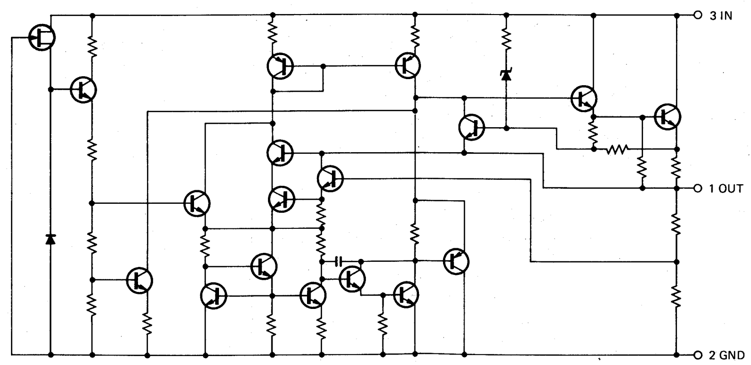
MSM4040RS


1
2
3
4
5
6
7
Vss 8
16 VDD
15
14
13
12
11
10
9
Q12
Q6
Q11
Q5
Q10
Q7
Q8
Q4
Q9
Q3
Reset
CLOCK
Q2
Q1

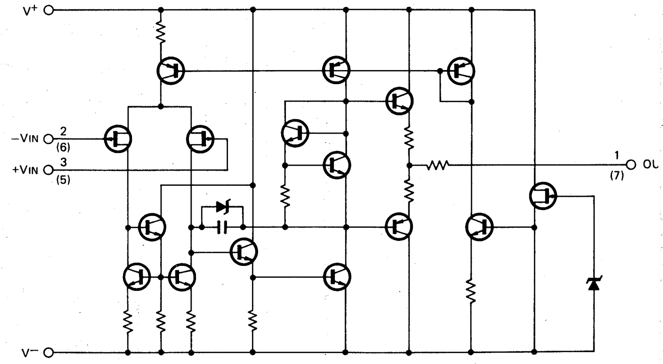
LA5512B

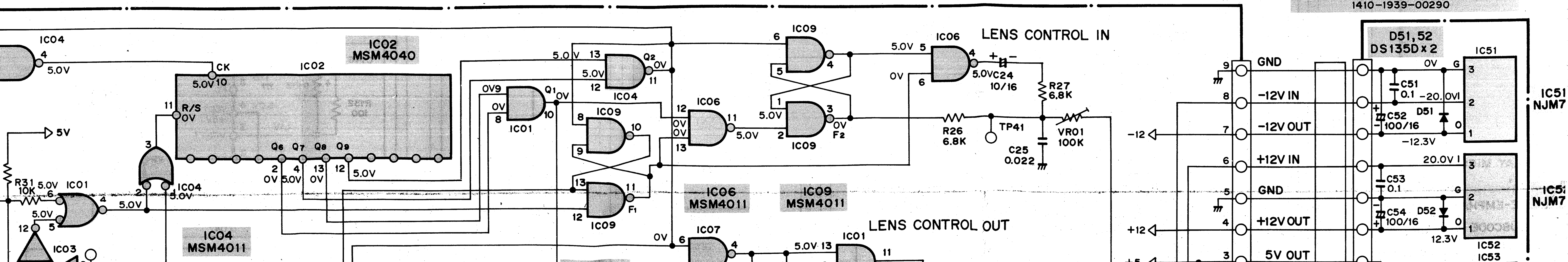

Vref
COMP
1 Vs
4 CON
3 OUT
2 GND

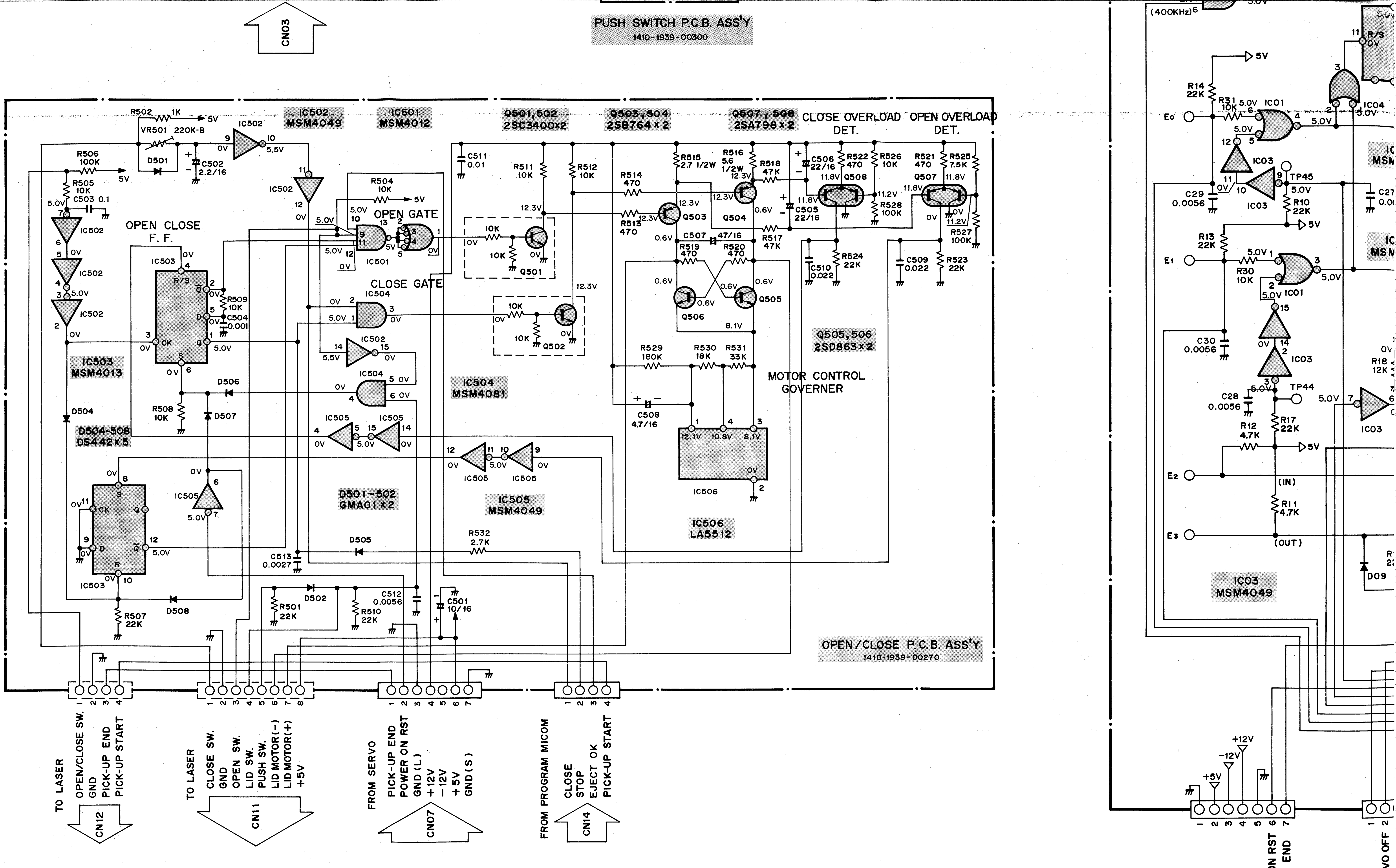
NJM78M12, NJM7805, NJM7812


3 IN
1 OUT
2 GND

NJM072D


V+
−VIN 2 (6)
+VIN 3 (5)
1 (7) OU
V−

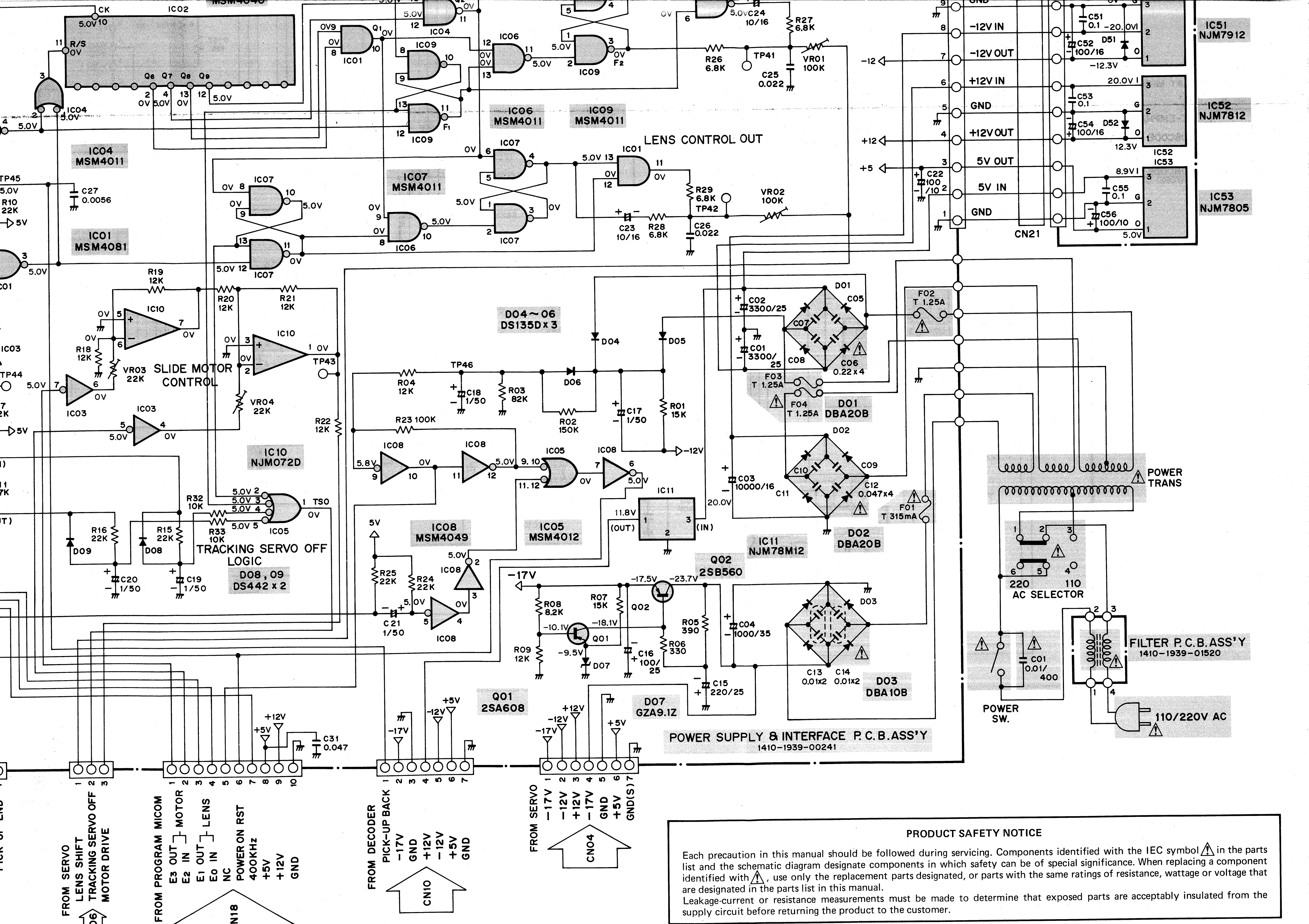

POWER SUPPLY P.C.B. ASS'Y
1410-1939-00290
IC04
5.0V
CK
IC02
IC02
MSM4040
5.0V 10
11 R/S
0V
Q6 Q7 Q8 Q9
2 4 13 12
0V 5.0V 0V
5.0V
5V
R31
10K
5.0V
IC01
6
5.0V
12
5
4
5.0V
IC03
3
2
1
IC04
5.0V
IC04
MSM4011
0V 9
0V
8
IC01
Q1
0V
10
5.0V 13
5.0V
12
Q2
0V
11
IC04
8
IC09
10
9
13
11
F1
12
IC09
IC06
12
0V
0V
13
11
5.0V
IC06
MSM4011
IC09
MSM4011
IC09
6
5
4
1
3
5.0V
2
0V
F2
IC09
IC06
5.0V 5
4
6
0V
5.0V
C24
10/16
LENS CONTROL IN
R27
6.8K
R26
6.8K
TP41
C25
0.022
VR01
100K
LENS CONTROL OUT
0V
6
IC07
4
5.0V 13
IC01
11
−12
+12
9 GND
8 −12V IN
7 −12V OUT
6 +12V IN
5 GND
4 +12V OUT
3 5V OUT
D51,52
DS135D×2
IC51
0V
G
3
2
1
C51
0.1
−20.0V
C52
100/16
D51
0
−12.3V
20.0V
3
C53
0.1
G
2
C54
100/16
D52
0
12.3V
1
IC52
IC53
IC51
NJM7
IC5
NJM7


PUSH SWITCH P.C.B. ASS'Y
1410-1939-00300
CN03
IC502 MSM4049
IC501 MSM4012
Q501,502 2SC3400x2
Q503,504 2SB764 x 2
Q507, 508 2SA798 x 2
CLOSE OVERLOAD DET.
OPEN OVERLOAD DET.
OPEN CLOSE F. F.
OPEN GATE
CLOSE GATE
IC503 MSM4013
IC504 MSM4081
D504~508 DS442 x 5
D501~502 GMA01 x 2
IC505 MSM4049
IC506 LA5512
Q505,506 2SD863 x 2
MOTOR CONTROL GOVERNER
OPEN/CLOSE P.C.B. ASS'Y
1410-1939-00270
R502 1K
VR501 220K-B
D501
C502 2.2/16
R506 100K
R505 10K
C503 0.1
R509 10K
C504 0.001
R508 10K
R507 22K
D506
D507
D505
D508
D502
R504 10K
R511 10K
R512 10K
R514 470
R513 470
R515 2.7 1/2W
R516 5.6 1/2W
R518 47K
R517 47K
R519 470
R520 470
R522 470
R526 10K
R521 470
R525 7.5K
R524 22K
R523 22K
R527 100K
R528 100K
R529 180K
R530 18K
R531 33K
R532 2.7K
R501 22K
R510 22K
C505 22/16
C506 22/16
C507 47/16
C508 4.7/16
C509 0.022
C510 0.022
C511 0.01
C512 0.0056
C513 0.0027
C501 10/16
TO LASER
OPEN/CLOSE SW.
GND
PICK-UP END
PICK-UP START
CN12
TO LASER
CLOSE SW.
GND
OPEN SW.
LID SW.
PUSH SW.
LID MOTOR(-)
LID MOTOR(+)
+5V
CN11
FROM SERVO
PICK-UP END
POWER ON RST
GND (L)
+12V
-12V
+5V
GND (S)
CN07
FROM PROGRAM MICOM
CLOSE
STOP
EJECT OK
PICK-UP START
CN14
(400KHz)
R/S
IC01
IC03
IC04
R14 22K
R31 10K
C29 0.0056
TP45
R10 22K
R13 22K
R30 10K
C30 0.0056
TP44
C28 0.0056
R12 4.7K
R17 22K
R11 4.7K
(IN)
(OUT)
D09
R18 12K
Eo
E1
E2
E3
IC03 MSM4049
FROM SERVO
GND (S)
+5V
-12V
+12V
GND (L)
POWER ON RST
PICK-UP END
CN08
FROM SERVO
LENS SHIFT
TRACKING SERVO OFF
CN06

NOTES:

1. All resistors values are indicated in "ohm" (K=10^3, M=10^6).
2. All capacitors values are indicated in "μF" (P=10^{-12})
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a multimeter.
   b. All voltages ±10% with respect to chassis ground
   c. Voltages in STOP mode; if two values are indicated, the upper one shows the voltage in PLAY mode and the lower one in STOP mode.
   d. AC input at 220 volts 50 Hz
   e. The wave forms in each section, which appear when a general music disc is used, are shown here.
4. This is a basic schematic diagram.

Because Fisher products are subject to continuous improvement, Fisher Corporation reserves the right to make any changes or modifications without notice.

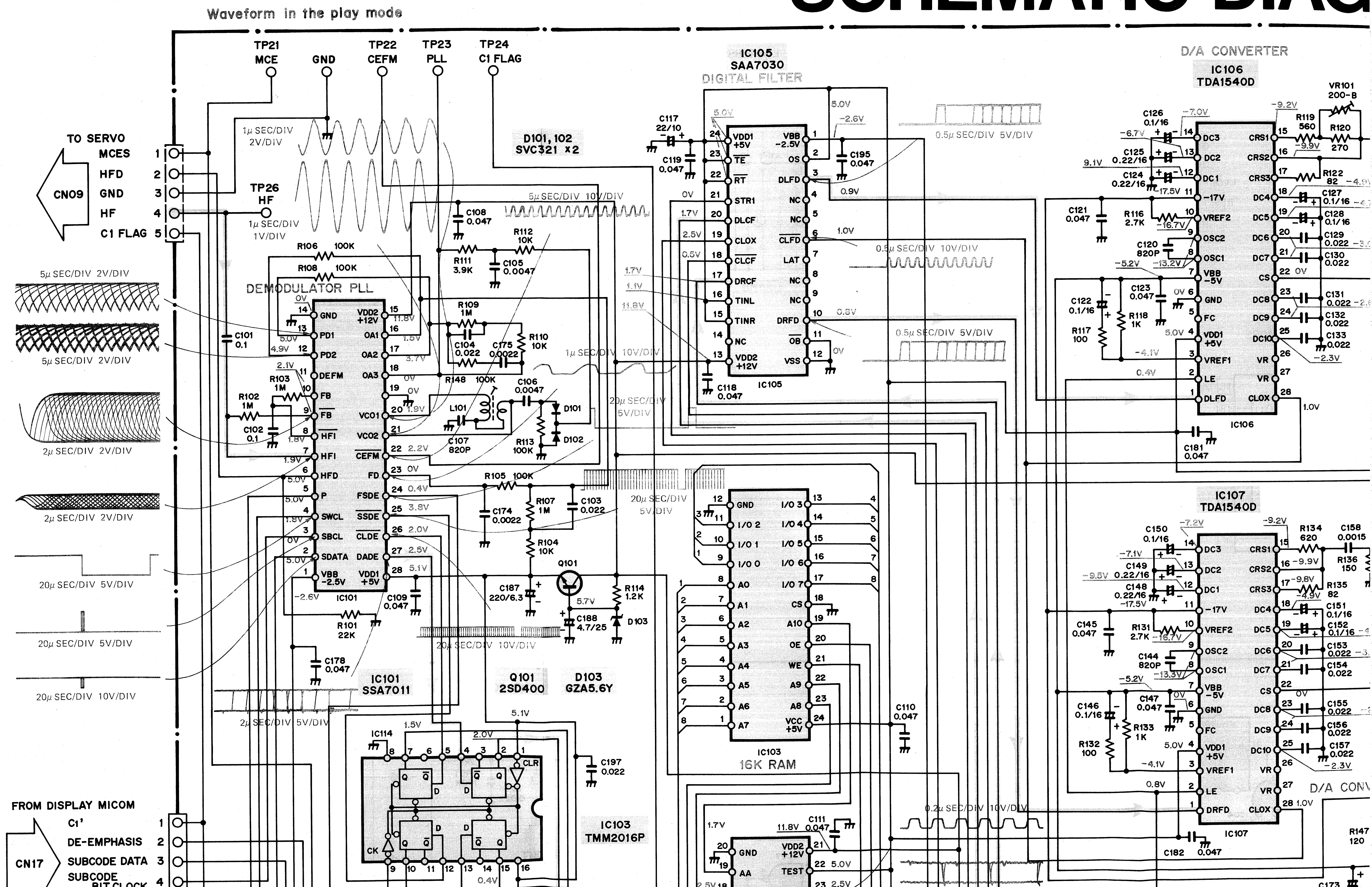

POWER SUPPLY & INTERFACE P.C.B. ASS'Y
1410-1939-00241
FILTER P.C.B. ASS'Y
1410-1939-01520
IC02
IC04 MSM4011
IC01 MSM4081
IC06 MSM4011
IC09 MSM4011
IC07 MSM4011
IC10 NJM072D
IC08 MSM4049
IC05 MSM4012
IC11 NJM78M12
IC51 NJM7912
IC52 NJM7812
IC53 NJM7805
Q01 2SA608
Q02 2SB560
D01 DBA20B
D02 DBA20B
D03 DBA10B
D04～06 DS135D x 3
D08, 09 DS442 x 2
D07 GZA9.1Z
LENS CONTROL OUT
SLIDE MOTOR CONTROL
TRACKING SERVO OFF LOGIC
TSO
POWER TRANS
AC SELECTOR
220
110
POWER SW.
110/220V AC
F01 T 315mA
F02 T 1.25A
F03 T 1.25A
F04 T 1.25A
CN21
-12V IN
-12V OUT
+12V IN
GND
+12V OUT
5V OUT
5V IN
GND
-12
+12
+5
TP41
TP42
TP43
TP44
TP45
TP46
VR01 100K
VR02 100K
VR03 22K
VR04 22K
R01 15K
R02 150K
R03 82K
R04 12K
R05 390
R06 330
R07 15K
R08 8.2K
R09 12K
R10 22K
R15 22K
R16 22K
R18 12K
R19 12K
R20 12K
R21 12K
R22 12K
R23 100K
R24 22K
R25 22K
R26 6.8K
R27 6.8K
R28 6.8K
R29 6.8K
R32 10K
R33 10K
C01 3300/25
C02 3300/25
C03 10000/16
C04 1000/35
C05
C06 0.22 x 4
C07
C08
C09
C10
C11
C12 0.047x4
C13 0.01x2
C14 0.01x2
C15 220/25
C16 100/25
C17 1/50
C18 1/50
C19 1/50
C20 1/50
C21 1/50
C22 100/10
C23 10/16
C24 10/16
C25 0.022
C26 0.022
C27 0.0056
C31 0.047
C51 0.1
C52 100/16
C53 0.1
C54 100/16
C55 0.1
C56 100/10
C01 0.01/400
D51
D52
-17V
-17.5V
-23.7V
-18.1V
-10.1V
-9.5V
20.0V
11.8V (OUT)
(IN)
-20.0V
-12.3V
20.0V
12.3V
8.9V
5.0V
FROM SERVO
LENS SHIFT
TRACKING SERVO OFF
MOTOR DRIVE
FROM PROGRAM MICOM
E3 OUT
E2 IN
MOTOR
E1 OUT
E0 IN
LENS
NC
POWER ON RST
400KHz
+5V
+12V
GND
FROM DECODER
PICK-UP BACK
-17V
GND
+12V
-12V
+5V
GND
CN10
FROM SERVO
-17V
-12V
+12V
-17V
GND
+5V
GND(S)
CN04

PRODUCT SAFETY NOTICE

Each precaution in this manual should be followed during servicing. Components identified with the IEC symbol ⚠ in the parts list and the schematic diagram designate components which safety can be of special significance. When replacing a component identified with ⚠, use only the replacement parts designated, or parts with the same ratings of resistance, wattage or voltage that are designated in the parts list in this manual.

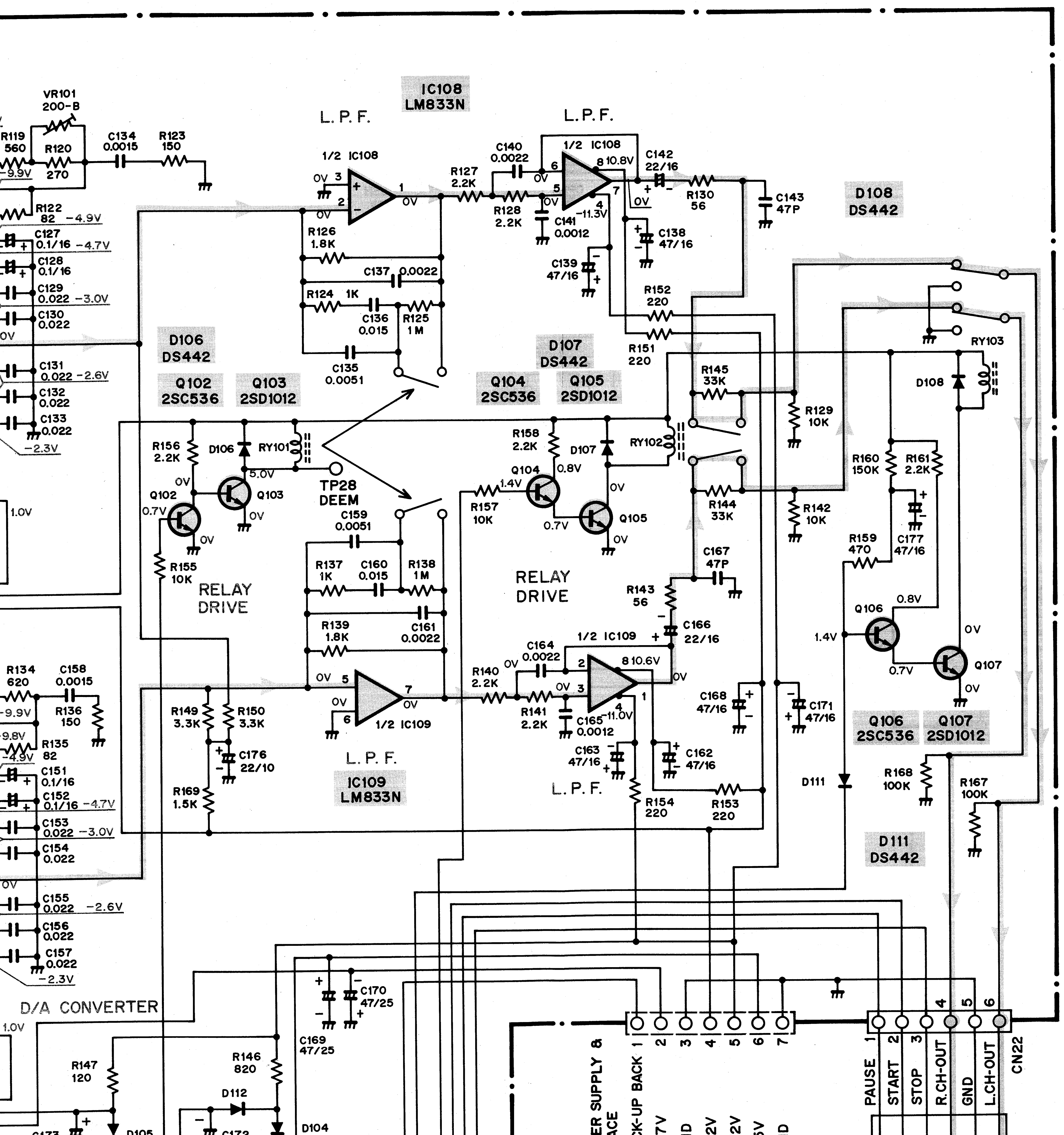
Leakage-current or resistance measurements must be made to determine that exposed parts are acceptably insulated from the supply circuit before returning the product to the customer.

SCHEMATIC DIAG



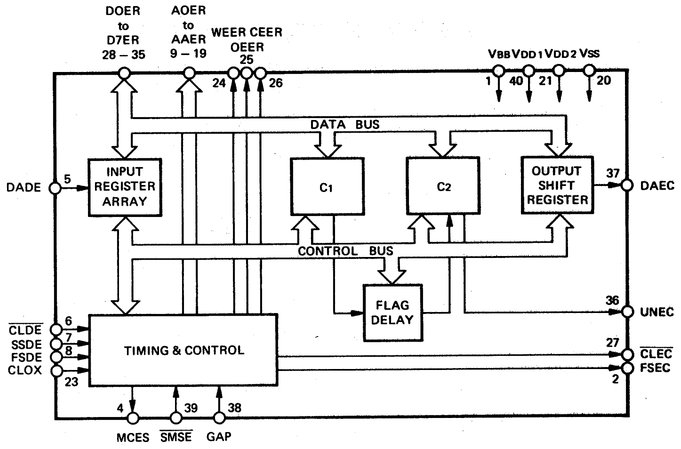
Waveform in the play mode
TP21 MCE
GND
TP22 CEFM
TP23 PLL
TP24 C1 FLAG
TP26 HF
TO SERVO
CN09
MCES
HFD
GND
HF
C1 FLAG
D101, 102 SVC321 ×2
IC105 SAA7030 DIGITAL FILTER
D/A CONVERTER
IC106 TDA1540D
VR101 200-B
DEMODULATOR PLL
IC101 SSA7011
Q101 2SD400
D103 GZA5.6Y
IC103 TMM2016P
IC103 16K RAM
IC107 TDA1540D
IC114
D/A CONV
FROM DISPLAY MICOM
CN17
C1'
DE-EMPHASIS
SUBCODE DATA
SUBCODE BIT CLOCK
1μ SEC/DIV 2V/DIV
1μ SEC/DIV 1V/DIV
5μ SEC/DIV 2V/DIV
2μ SEC/DIV 2V/DIV
20μ SEC/DIV 5V/DIV
20μ SEC/DIV 10V/DIV
5μ SEC/DIV 10V/DIV
0.5μ SEC/DIV 5V/DIV
0.5μ SEC/DIV 10V/DIV
1μ SEC/DIV 10V/DIV
2μ SEC/DIV 5V/DIV
0.2μ SEC/DIV 10V/DIV

AGRAM (DECODER, OUTPUT)



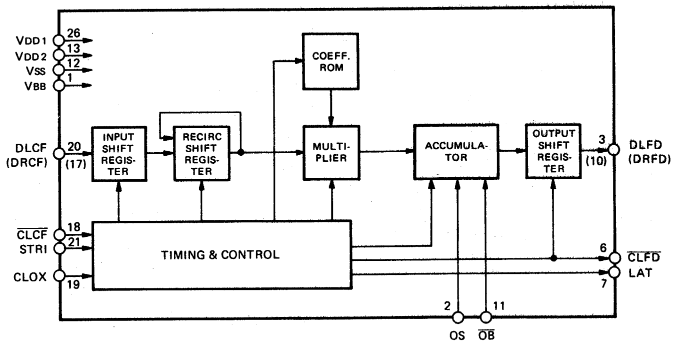
IC108 LM833N
L. P. F.
1/2 IC108
VR101 200-B
R119 560
R120 270
C134 0.0015
R123 150
R122 82 -4.9V
C127 0.1/16 -4.7V
C128 0.1/16
C129 0.022 -3.0V
C130 0.022
C131 0.022 -2.6V
C132 0.022
C133 0.022
-2.3V
-9.9V
R126 1.8K
R124 1K
C136 0.015
R125 1M
C137 0.0022
C135 0.0051
R127 2.2K
R128 2.2K
C140 0.0022
C141 0.0012
C139 47/16
C142 22/16
C138 47/16
R130 56
C143 47P
-11.3V
10.8V
R152 220
R151 220
D108 DS442
D106 DS442
D107 DS442
Q102 2SC536
Q103 2SD1012
Q104 2SC536
Q105 2SD1012
RY101
RY102
RY103
TP28 DEEM
R156 2.2K
R155 10K
RELAY DRIVE
R158 2.2K
R157 10K
R145 33K
R144 33K
R129 10K
R142 10K
R160 150K
R161 2.2K
R159 470
C177 47/16
C159 0.0051
R137 1K
C160 0.015
R138 1M
R139 1.8K
C161 0.0022
C167 47P
R143 56
C166 22/16
1/2 IC109
IC109 LM833N
C164 0.0022
R140 2.2K
R141 2.2K
C165 0.0012
C163 47/16
C162 47/16
C168 47/16
C171 47/16
R154 220
R153 220
10.6V
-11.0V
Q106 2SC536
Q107 2SD1012
D111 DS442
R168 100K
R167 100K
R134 620
C158 0.0015
R136 150
R135 82
R149 3.3K
R150 3.3K
C176 22/10
R169 1.5K
C151 0.1/16
C152 0.1/16 -4.7V
C153 0.022 -3.0V
C154 0.022
C155 0.022 -2.6V
C156 0.022
C157 0.022
-2.3V
-9.8V
D/A CONVERTER
R147 120
R146 820
D112
D104
C169 47/25
C170 47/25
1.0V
PAUSE
START
STOP
R.CH-OUT
GND
L.CH-OUT
CN22
ER SUPPLY & ACE
CK-UP BACK

SAA7020



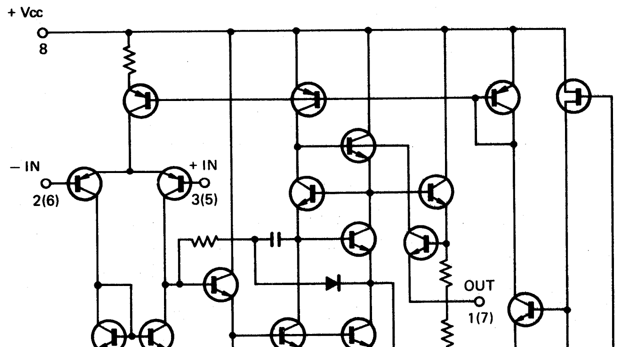
DOER to D7ER 28 – 35
AOER to AAER 9 – 19
WEER CEER OEER
VBB VDD1 VDD2 VSS
DATA BUS
INPUT REGISTER ARRAY
C1
C2
OUTPUT SHIFT REGISTER
DADE
DAEC
CONTROL BUS
FLAG DELAY
UNEC
TIMING & CONTROL
CLDE
SSDE
FSDE
CLOX
CLEC
FSEC
MCES
SMSE
GAP

SAA7030

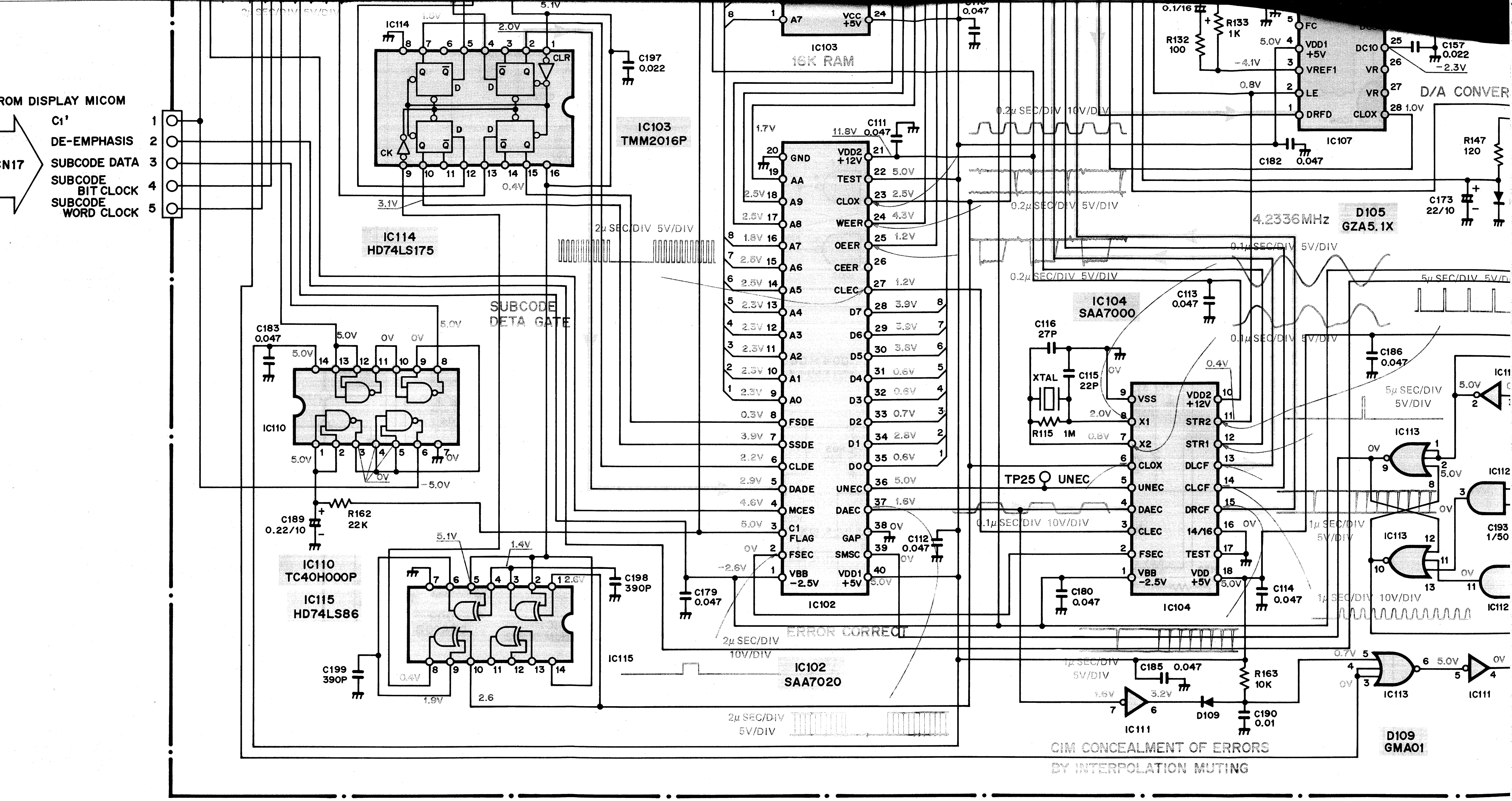


VDD1
VDD2
VSS
VBB
COEFF. ROM
DLCF (DRCF)
INPUT SHIFT REGISTER
RECIRC SHIFT REGISTER
MULTIPLIER
ACCUMULATOR
OUTPUT SHIFT REGISTER
DLFD (DRFD)
CLCF
STRI
CLOX
TIMING & CONTROL
CLFD
LAT
OS
OB

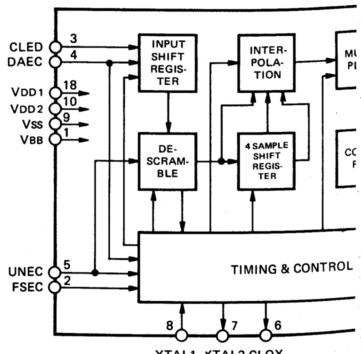
LM833N



+ Vcc
8
– IN
2(6)
+ IN
3(5)
OUT
1(7)


FROM DISPLAY MICOM
CN17
C1'
DE-EMPHASIS
SUBCODE DATA
SUBCODE BIT CLOCK
SUBCODE WORD CLOCK
IC114
HD74LS175
IC103
TMM2016P
16K RAM
IC110
TC40H000P
IC115
HD74LS86
SUBCODE DETA GATE
IC102
SAA7020
ERROR CORRECT
IC104
SAA7000
TP25 UNEC
IC107
D/A CONVER
D105
GZA5.1X
4.2336MHz
XTAL
R115 1M
C116 27P
C115 22P
IC113
IC111
IC112
D109
GMA01
R163 10K
C185 0.047
C190 0.01
C180 0.047
C114 0.047
C112 0.047
C179 0.047
C113 0.047
C186 0.047
C111 0.047
C183 0.047
C189 0.22/10
R162 22K
C197 0.022
C198 390P
C199 390P
C157 0.022
C182 0.047
C173 22/10
R147 120
R132 100
R133 1K
CIM CONCEALMENT OF ERRORS BY INTERPOLATION MUTING
2μ SEC/DIV 5V/DIV
0.2μ SEC/DIV 10V/DIV
0.2μ SEC/DIV 5V/DIV
0.1μ SEC/DIV 5V/DIV
1μ SEC/DIV 10V/DIV
2μ SEC/DIV 10V/DIV
0.1μ SEC/DIV 10V/DIV
5μ SEC/DIV 5V/DIV
1μ SEC/DIV 5V/DIV

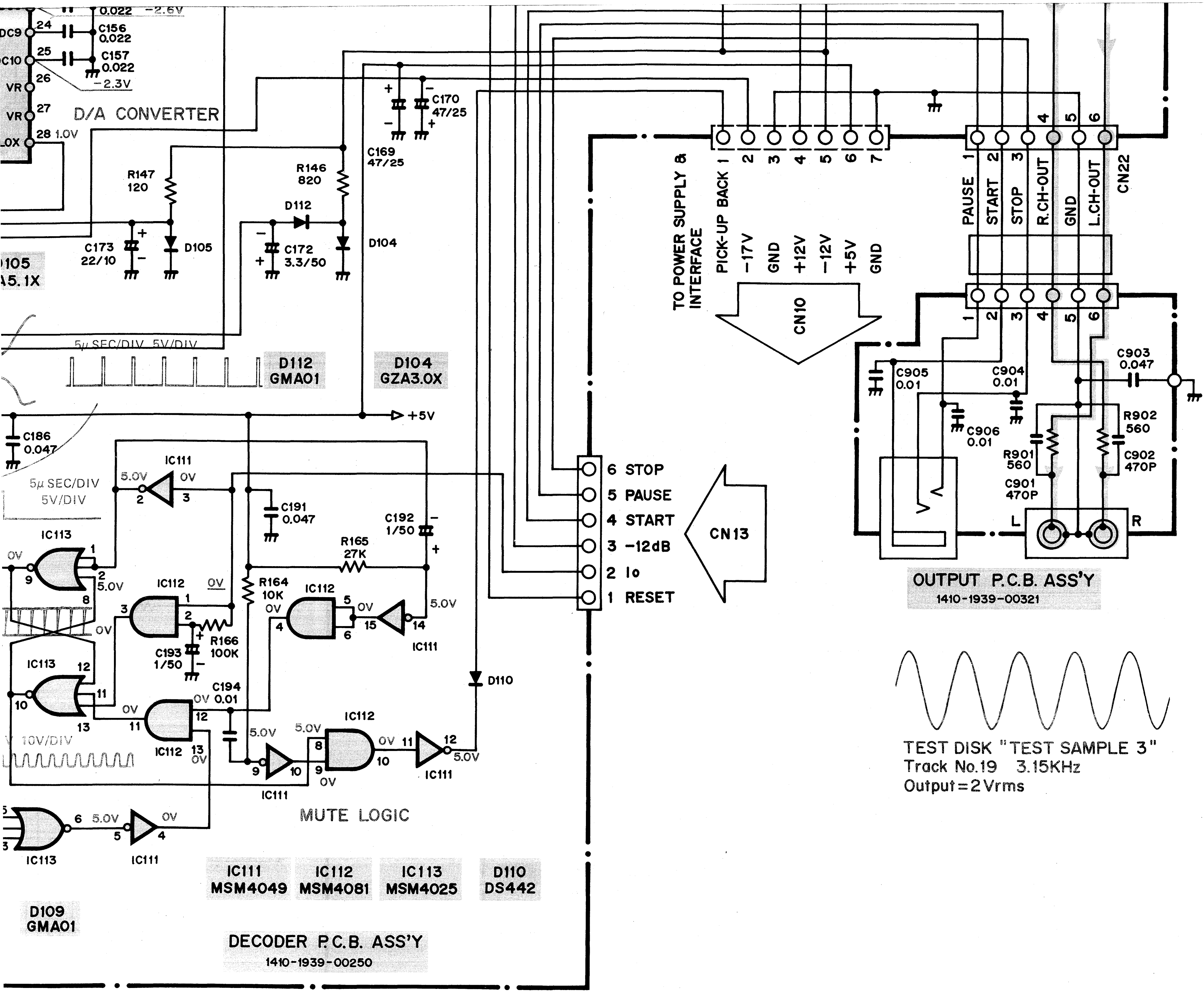
SAA


CLED
DAEC
VDD1
VDD2
VSS
VBB
UNEC
FSEC
INPUT SHIFT REGISTER
INTERPOLATION
DESCRAMBLE
4 SAMPLE SHIFT REGISTER
TIMING & CONTROL

NOTES:

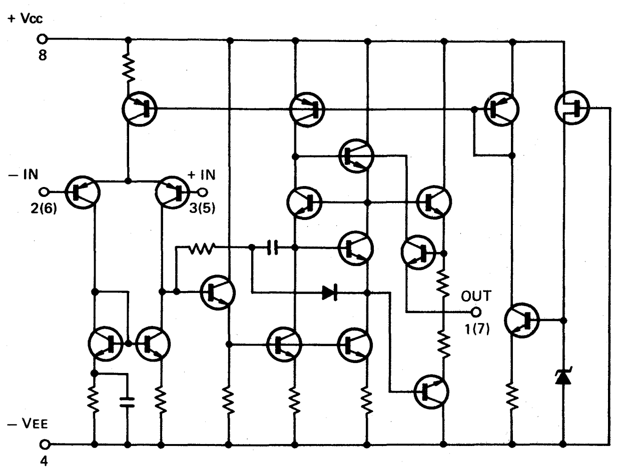
1. All resistors values are indicated in "ohm" ($K=10^3$, $M=10^6$).
2. All capacitors values are indicated in "μF" ($P=10^{-12}$)
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a multimeter.
   b. All voltages ±10% with respect to chassis ground
   c. Voltages in STOP mode; if two values are indicated, the upper one shows the voltage in PLAY mode and the lower one in STOP mode.
   d. AC input at 220 volts 50 Hz
   e. The wave forms in each section, which appear when a general music disc is used, are shown here.
4. This is a basic schematic diagram.

Because Fisher products are subject to continuous improvement, Fisher Corporation reserves the right to make any changes or modifications without notice.

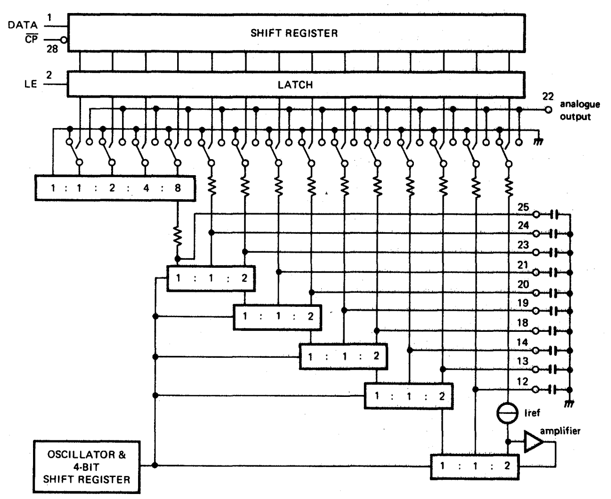

D/A CONVERTER
C156 0.022
C157 0.022
-2.3V
-2.6V
R147 120
R146 820
D112
D105
D104
C173 22/10
C172 3.3/50
C169 47/25
C170 47/25
D105 A5.1X
D112 GMA01
D104 GZA3.0X
5µ SEC/DIV 5V/DIV
+5V
C186 0.047
IC111
IC112
IC113
C191 0.047
C192 1/50
R165 27K
R164 10K
R166 100K
C193 1/50
C194 0.01
D110
10V/DIV
MUTE LOGIC
IC111 MSM4049
IC112 MSM4081
IC113 MSM4025
D110 DS442
D109 GMA01
DECODER P.C.B. ASS'Y
1410-1939-00250
TO POWER SUPPLY & INTERFACE
PICK-UP BACK
-17V
GND
+12V
-12V
+5V
GND
CN10
6 STOP
5 PAUSE
4 START
3 -12dB
2 Io
1 RESET
CN13
PAUSE
START
STOP
R.CH-OUT
GND
L.CH-OUT
CN22
C905 0.01
C904 0.01
C903 0.047
C906 0.01
R901 560
R902 560
C901 470P
C902 470P
L
R
OUTPUT P.C.B. ASS'Y
1410-1939-00321

TEST DISK "TEST SAMPLE 3"
Track No.19 3.15KHz
Output=2Vrms

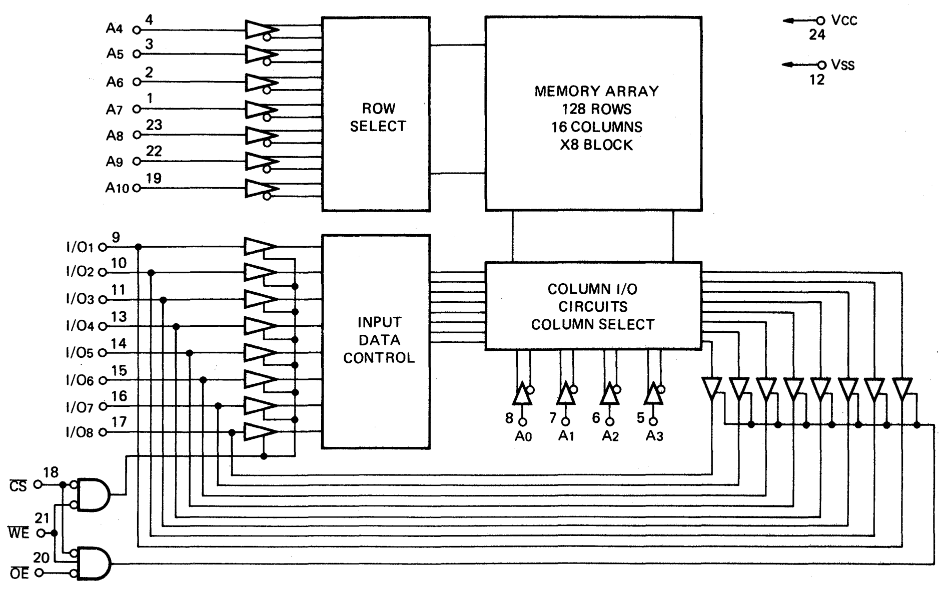
LM833N


+Vcc
8
-IN
2(6)
+IN
3(5)
OUT
1(7)
-VEE
4

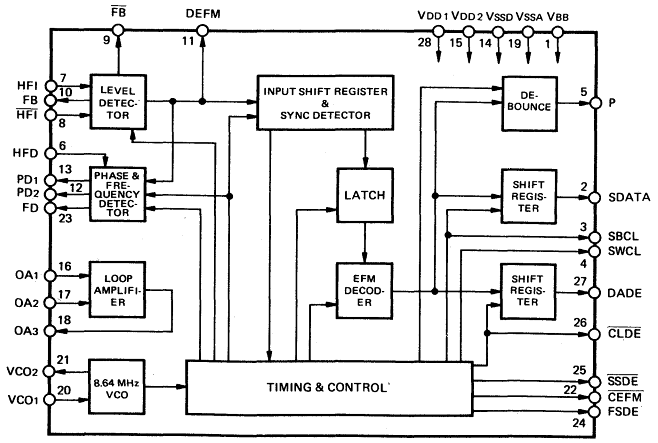
TDA1540D


DATA
CP
LE
SHIFT REGISTER
LATCH
22 analogue output
OSCILLATOR & 4-BIT SHIFT REGISTER
Iref
amplifier

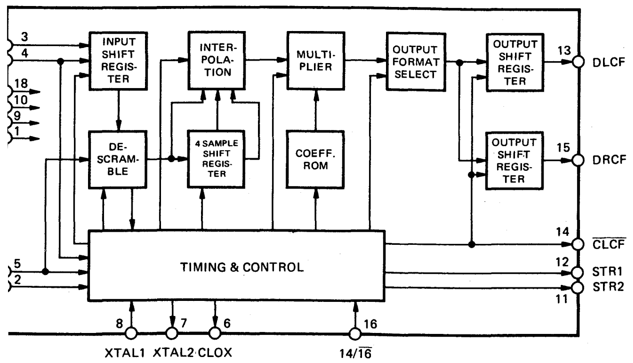
TMM2016


A4
A5
A6
A7
A8
A9
A10
ROW SELECT
MEMORY ARRAY
128 ROWS
16 COLUMNS
X8 BLOCK
Vcc 24
Vss 12
I/O1
I/O2
I/O3
I/O4
I/O5
I/O6
I/O7
I/O8
INPUT DATA CONTROL
COLUMN I/O CIRCUITS
COLUMN SELECT
A0
A1
A2
A3
CS
WE
OE

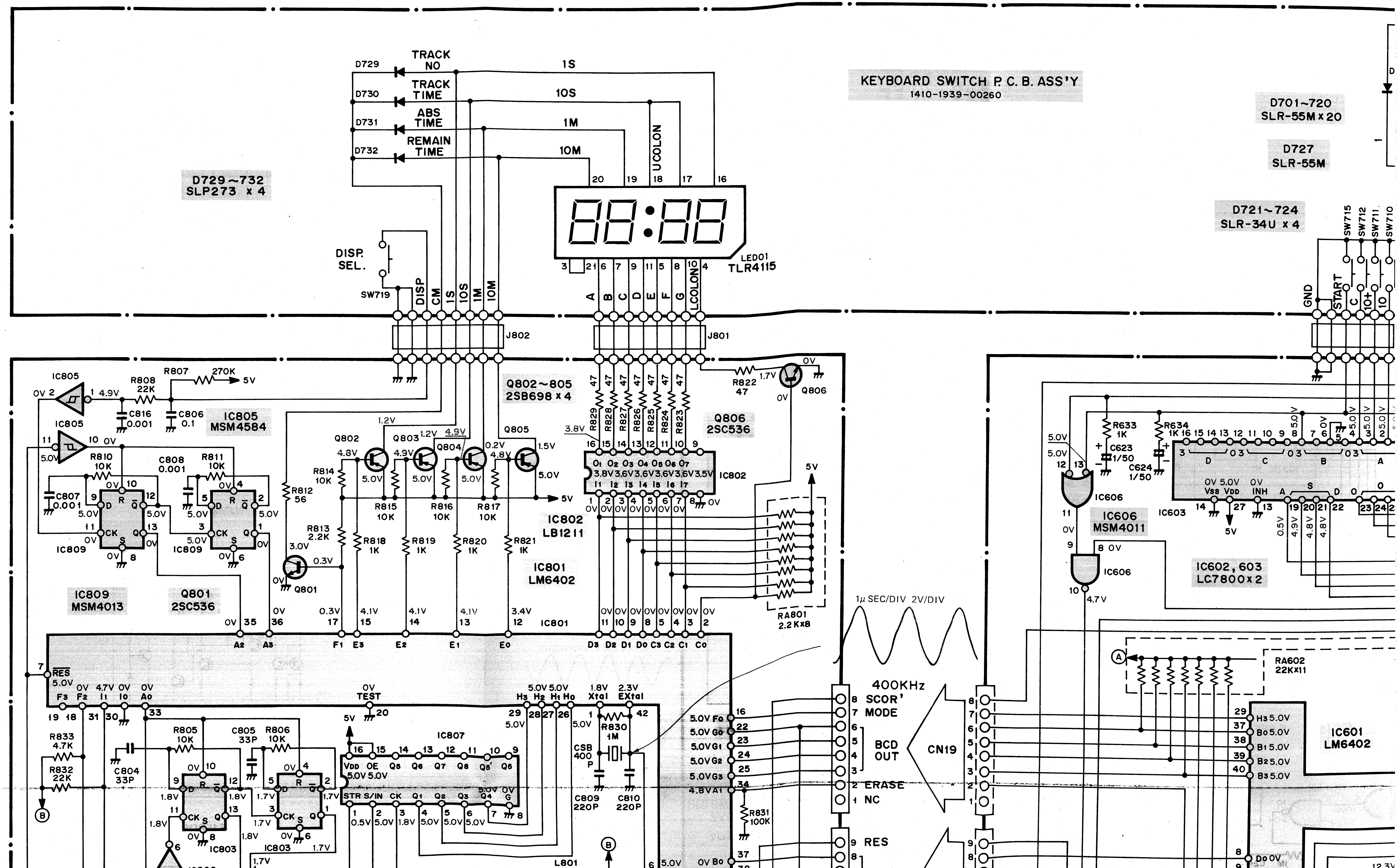
SAA7011


FB
DEFM
VDD1 VDD2 VSSD VSSA VBB
HFI
FB
HFI
HFD
PD1
PD2
FD
OA1
OA2
OA3
VCO2
VCO1
LEVEL DETECTOR
PHASE & FREQUENCY DETECTOR
LOOP AMPLIFIER
8.64 MHz VCO
INPUT SHIFT REGISTER & SYNC DETECTOR
LATCH
EFM DECODER
DEBOUNCE
SHIFT REGISTER
SHIFT REGISTER
TIMING & CONTROL
P
SDATA
SBCL
SWCL
DADE
CLDE
SSDE
CEFM
FSDE

SAA7000

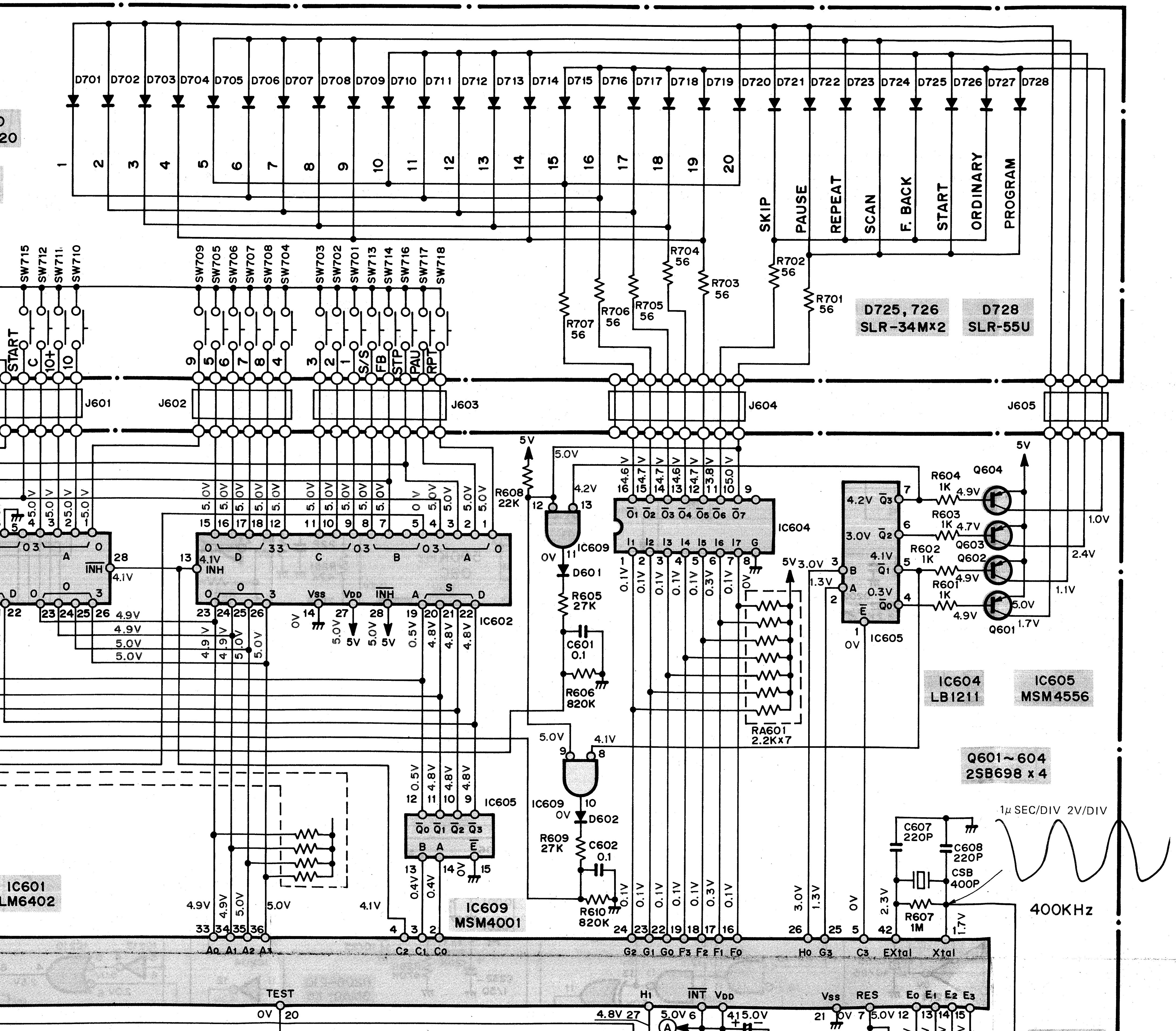

INPUT SHIFT REGISTER
INTERPOLATION
MULTIPLIER
OUTPUT FORMAT SELECT
OUTPUT SHIFT REGISTER
OUTPUT SHIFT REGISTER
DESCRAMBLE
4 SAMPLE SHIFT REGISTER
COEFF. ROM
TIMING & CONTROL
DLCF
DRCF
CLCF
STR1
STR2
XTAL1
XTAL2
CLOX
14/16

SCHEMATIC DIAGRAM (I

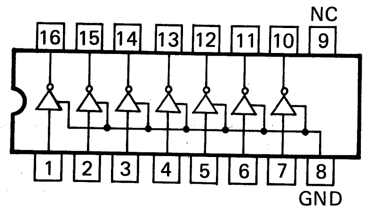


KEYBOARD SWITCH P.C.B. ASS'Y
1410-1939-00260
D701~720
SLR-55M x 20
D727
SLR-55M
D721~724
SLR-34U x 4
D729~732
SLP273 x 4
D729
D730
D731
D732
TRACK NO
TRACK TIME
ABS TIME
REMAIN TIME
1S
10S
1M
10M
UCOLON
LCOLON
LED01
TLR4115
DISP. SEL.
SW719
DISP
CM
1S
10S
1M
10M
A
B
C
D
E
F
G
J802
J801
GND
START
C
10+
10
SW715
SW712
SW711
SW710
IC805
MSM4584
R808 22K
R807 270K
5V
C816 0.001
C806 0.1
Q802~805
2SB698 x 4
Q802
Q803
Q804
Q805
R814 10K
R815 10K
R816 10K
R817 10K
R812 56
R813 2.2K
R818 1K
R819 1K
R820 1K
R821 1K
Q801
2SC536
IC809
MSM4013
R810 10K
R811 10K
C807 0.001
C808 0.001
R829
R828
R827
R826
R825
R824
R823
47
R822 47
Q806
2SC536
IC802
LB1211
IC801
LM6402
RA801
2.2K x 8
1μSEC/DIV 2V/DIV
400KHz
SCOR'
MODE
BCD OUT
ERASE
NC
RES
CN19
RES
F3
F2
I1
I0
A0
TEST
H3
H2
H1
H0
Xtal
EXtal
A2
A3
F1
E3
E2
E1
E0
D3
D2
D1
D0
C3
C2
C1
C0
R830 1M
CSB 400 P
C809 220P
C810 220P
R831 100K
R833 4.7K
R832 22K
C804 33P
R805 10K
C805 33P
R806 10K
IC803
IC807
VDD
OE
STR
S/IN
CK
L801
R633 1K
R634 1K
C623 1/50
C624 1/50
IC606
MSM4011
IC603
IC602, 603
LC7800 x 2
VSS
VDD
INH
RA602
22K x 11
IC601
LM6402

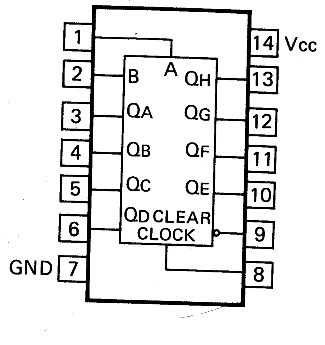
M (KEYBOARD SWITCH, DISPLAY MICOM, PROGRAM MICOM)


D701 D702 D703 D704 D705 D706 D707 D708 D709 D710 D711 D712 D713 D714 D715 D716 D717 D718 D719 D720 D721 D722 D723 D724 D725 D726 D727 D728
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
SKIP
PAUSE
REPEAT
SCAN
F. BACK
START
ORDINARY
PROGRAM
SW715 SW712 SW711 SW710
SW709 SW705 SW706 SW707 SW708 SW704
SW703 SW702 SW701 SW713 SW714 SW716 SW717 SW718
START C 10+ 10
9 5 6 7 8 4
3 2 1 S/S FB STP PAU RPT
J601
J602
J603
J604
J605
R704 56
R703 56
R702 56
R701 56
R707 56
R706 56
R705 56
D725, 726 SLR-34M×2
D728 SLR-55U
R608 22K
5V
5.0V
4.2V
0V
IC609
D601
R605 27K
C601 0.1
R606 820K
IC604
RA601 2.2K×7
IC605
R604 1K
R603 1K
R602 1K
R601 1K
Q604
Q603
Q602
Q601
1.0V
2.4V
1.1V
1.7V
IC604 LB1211
IC605 MSM4556
Q601~604 2SB698 x 4
IC602
IC609
D602
R609 27K
C602 0.1
R610 820K
C607 220P
C608 220P
CSB 400P
R607 1M
1μ SEC/DIV 2V/DIV
400KHz
IC601 LM6402
IC609 MSM4001
A0 A1 A2 A3
C2 C1 C0
G2 G1 G0 F3 F2 F1 F0
H0 G3 C3 EXtal Xtal
TEST
H1 INT VDD
VSS RES E0 E1 E2 E3

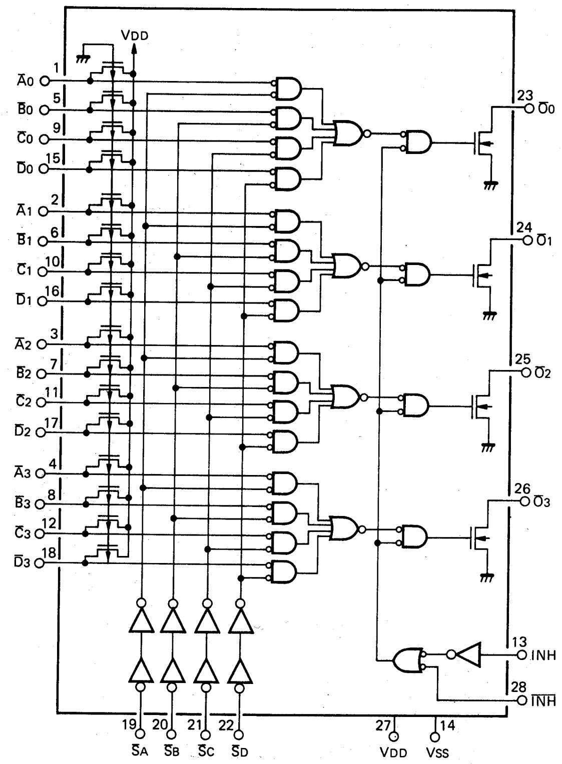
LB1211


16 15 14 13 12 11 10 9
NC
1 2 3 4 5 6 7 8
GND

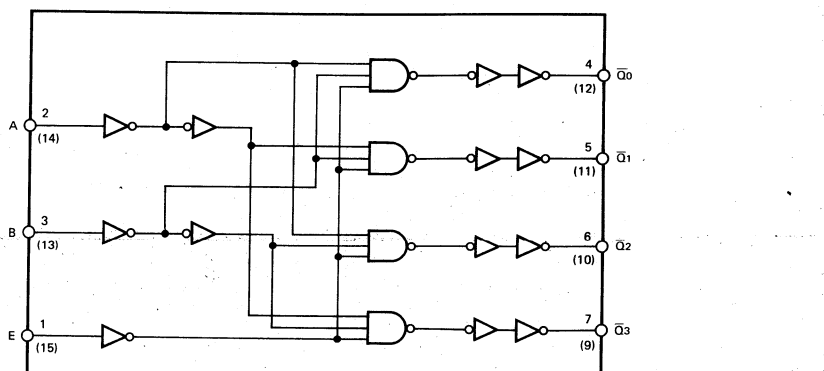
HD74LS164

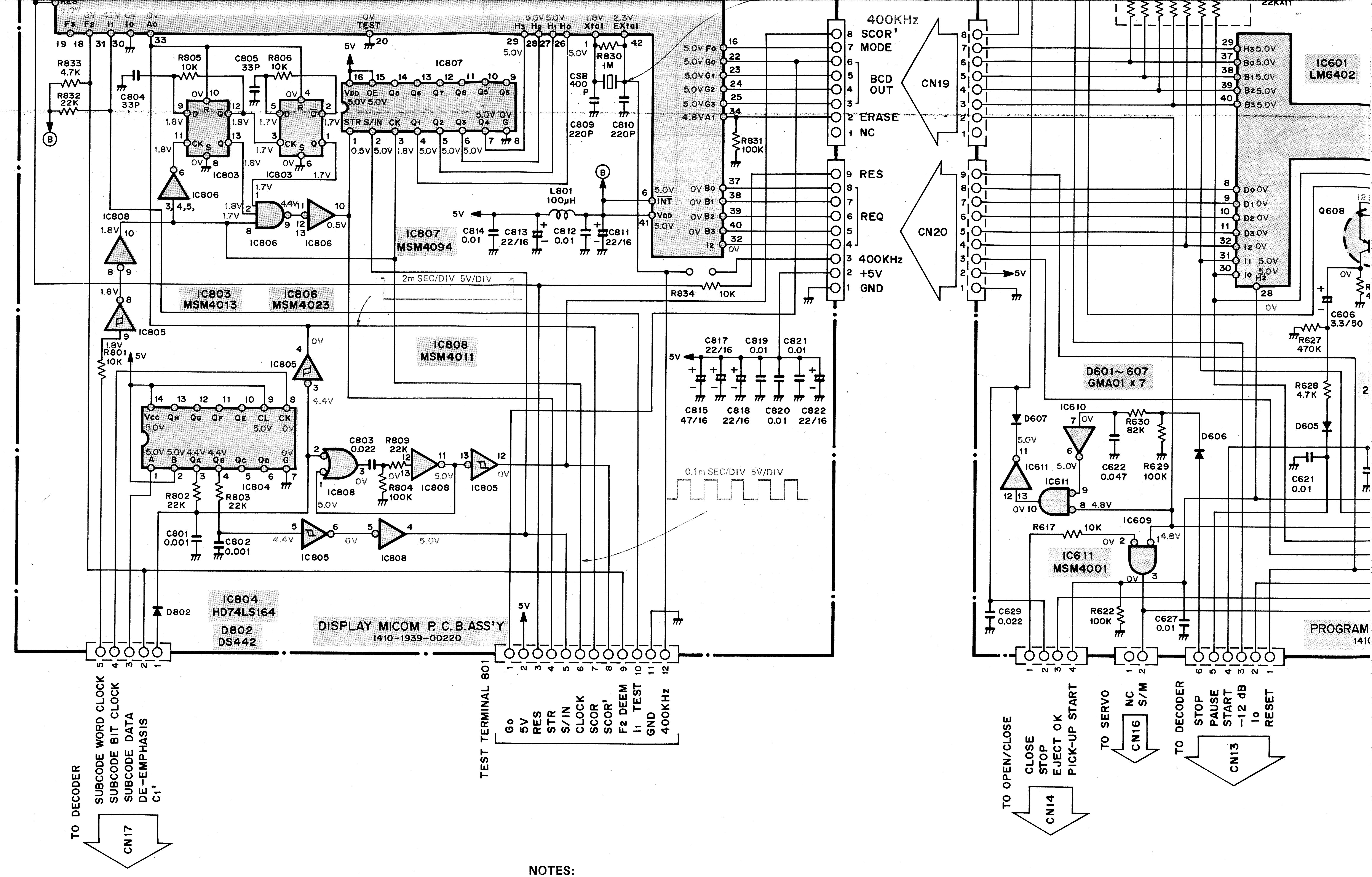

Vcc
B A QH QG QF QE
QA QB QC QD
CLEAR CLOCK
GND
1 2 3 4 5 6 7 8 9 10 11 12 13 14

LC7800


VDD
A0 B0 C0 D0
A1 B1 C1 D1
A2 B2 C2 D2
A3 B3 C3 D3
O0 O1 O2 O3
INH
INH
SA SB SC SD
VDD VSS

MSM4556RS

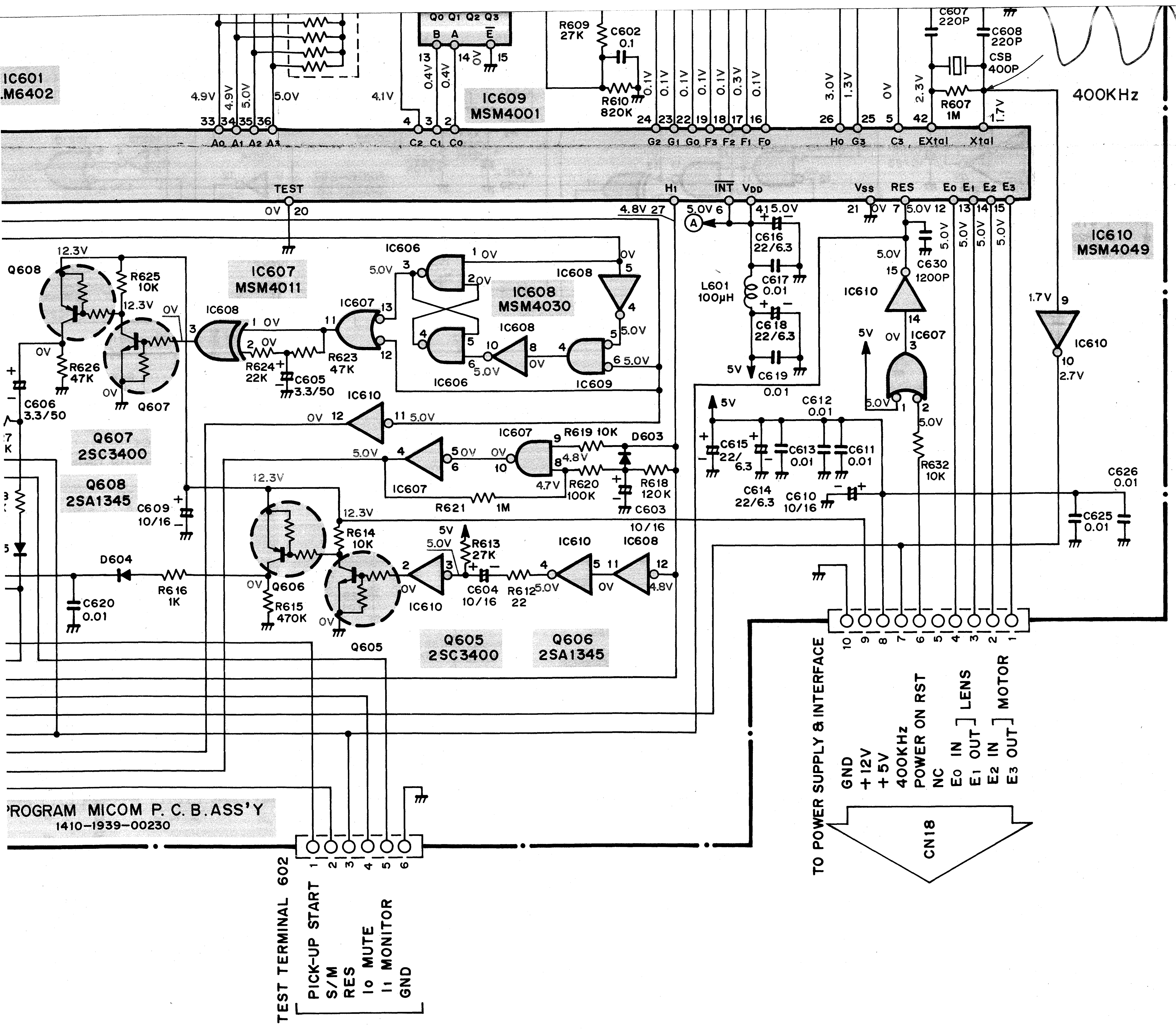

A
B
E
Q0 Q1 Q2 Q3

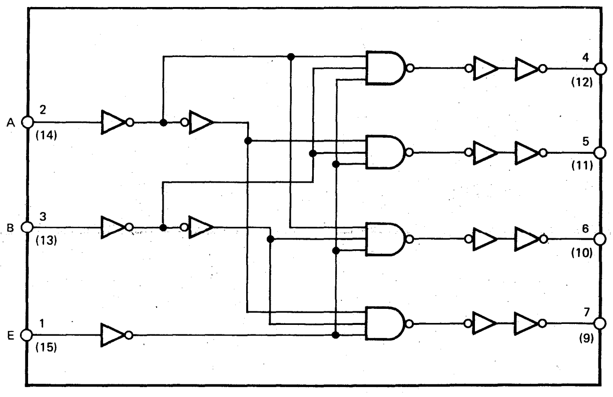

IC803
MSM4013
IC806
MSM4023
IC807
MSM4094
IC808
MSM4011
IC804
HD74LS164
D802
DS442
IC601
LM6402
D601~607
GMA01 x 7
IC611
MSM4001
IC805
IC610
IC609
Q608
DISPLAY MICOM P. C. B. ASS'Y
1410-1939-00220
PROGRAM
2m SEC/DIV 5V/DIV
0.1m SEC/DIV 5V/DIV
400KHz
SCOR'
MODE
BCD OUT
ERASE
NC
RES
REQ
400KHz
+5V
GND
CN19
CN20
L801
100μH
CSB 400 P
R830 1M
R831 100K
R834 10K
R833 4.7K
R832 22K
R805 10K
R806 10K
C805 33P
C804 33P
C809 220P
C810 220P
C814 0.01
C813 22/16
C812 0.01
C811 22/16
C817 22/16
C819 0.01
C821 0.01
C815 47/16
C818 22/16
C820 0.01
C822 22/16
C803 0.022
R809 22K
R804 100K
R801 10K
R802 22K
R803 22K
C801 0.001
C802 0.001
R627 470K
C606 3.3/50
R628 4.7K
D605
D606
D607
R630 82K
C622 0.047
R629 100K
C621 0.01
R617 10K
R622 100K
C627 0.01
C629 0.022
TO DECODER
SUBCODE WORD CLOCK
SUBCODE BIT CLOCK
SUBCODE DATA
DE-EMPHASIS
C1'
CN17
TEST TERMINAL 801
G0
5V
RES
STR
S/IN
CLOCK
SCOR
SCOR'
F2 DEEM
I1 TEST
GND
400KHz
TO OPEN/CLOSE
CLOSE
STOP
EJECT OK
PICK-UP START
CN14
TO SERVO
NC
S/M
CN16
TO DECODER
STOP
PAUSE
START
-12 dB
I0
RESET
CN13

NOTES:

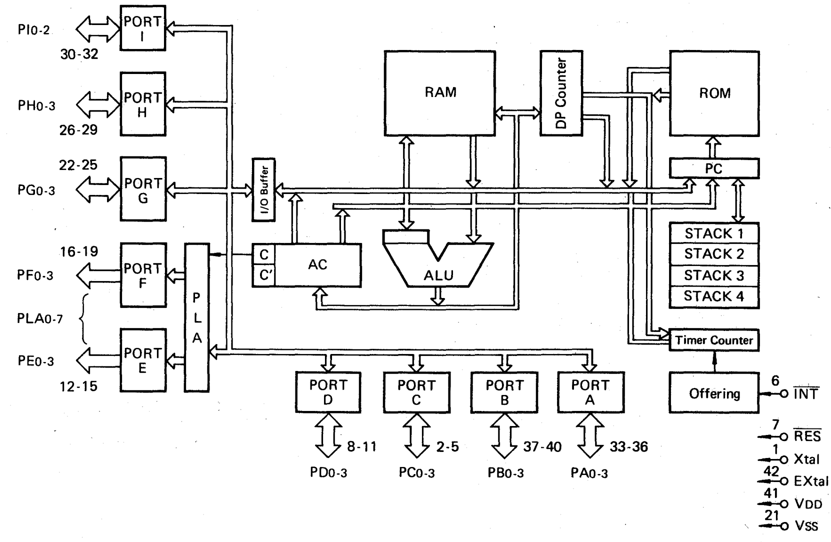
1. All resistors values are indicated in "ohm" (K=10^3, M=10^6).
2. All capacitors values are indicated in "μF" (P=10^{-12})
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a multimeter.
   b. All voltages ±10% with respect to chassis ground
   c. Voltages in STOP mode; if two values are indicated, the upper one shows the PLAY mode and the lower one in STOP mode.
   d. AC input at 220 volts 50 Hz
   e. The wave forms in each section, which appear when a general music disc is us
4. This is a basic schematic diagram.

Because Fisher products are subject to continuous improvement, Fisher Corporation reserves the right to make any changes or modifications without

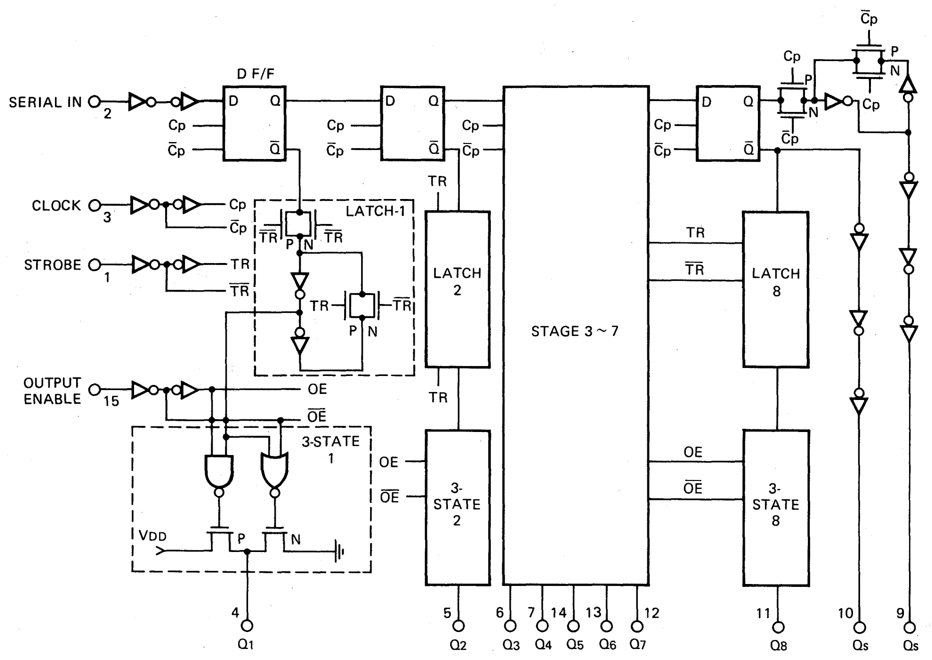

IC601
LM6402
IC609
MSM4001
400KHz
IC607
MSM4011
IC606
IC608
MSM4030
IC610
MSM4049
Q607
2SC3400
Q608
2SA1345
Q605
2SC3400
Q606
2SA1345
TEST
INT
VDD
Vss
RES
Xtal
EXtal
L601 100μH
C616 22/6.3
C617 0.01
C618 22/6.3
C619 0.01
C630 1200P
R632 10K
C626 0.01
C625 0.01
C607 220P
C608 220P
CSB 400P
R607 1M
R609 27K
C602 0.1
R610 820K
R625 10K
R626 47K
R624 22K
R623 47K
C605 3.3/50
C606 3.3/50
C609 10/16
R619 10K
D603
R618 120K
R620 100K
C603 10/16
R621 1M
R614 10K
R615 470K
R613 27K
C604 10/16
R612 22
D604
R616 1K
C620 0.01
C612 0.01
C613 0.01
C611 0.01
C615 22/6.3
C614 22/6.3
C610 10/16
PROGRAM MICOM P.C.B. ASS'Y
1410-1939-00230
TEST TERMINAL 602
1 PICK-UP START
2 S/M
3 RES
4 I0 MUTE
5 I1 MONITOR
6 GND
TO POWER SUPPLY & INTERFACE
10 GND
9 +12V
8 +5V
7 400KHz
6 POWER ON RST
5 NC
4 E0 IN
3 E1 OUT
2 E2 IN
1 E3 OUT
LENS
MOTOR
CN18

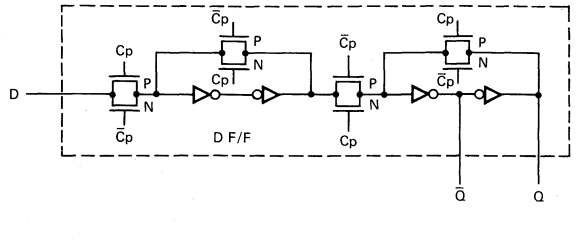

A
B
E
Q0
Q1
Q2
Q3

LM6402A


PORT I
PORT H
PORT G
PORT F
PORT E
PORT D
PORT C
PORT B
PORT A
RAM
ROM
DP Counter
PC
AC
ALU
PLA
I/O Buffer
STACK 1
STACK 2
STACK 3
STACK 4
Timer Counter
Offering
INT
RES
Xtal
EXtal
VDD
Vss

MSM4094RS


SERIAL IN
CLOCK
STROBE
OUTPUT ENABLE
D F/F
LATCH-1
LATCH 2
LATCH 8
STAGE 3 ~ 7
3-STATE 1
3-STATE 2
3-STATE 8
Q1
Q2
Q3
Q4
Q5
Q6
Q7
Q8
Qs
Qs



shows the voltage in

: disc is used, are shown here.

ut notice.

SCHEMATIC D

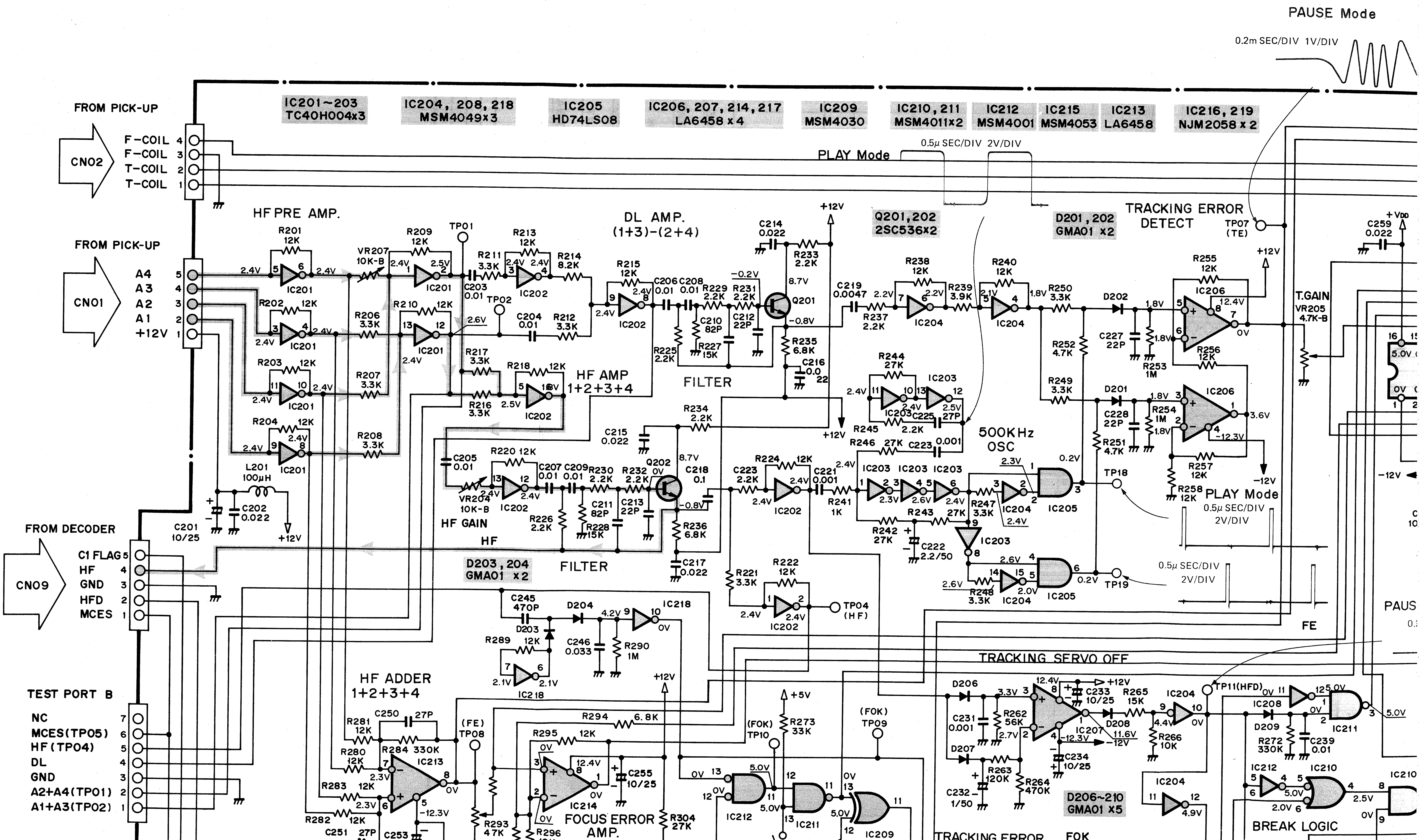
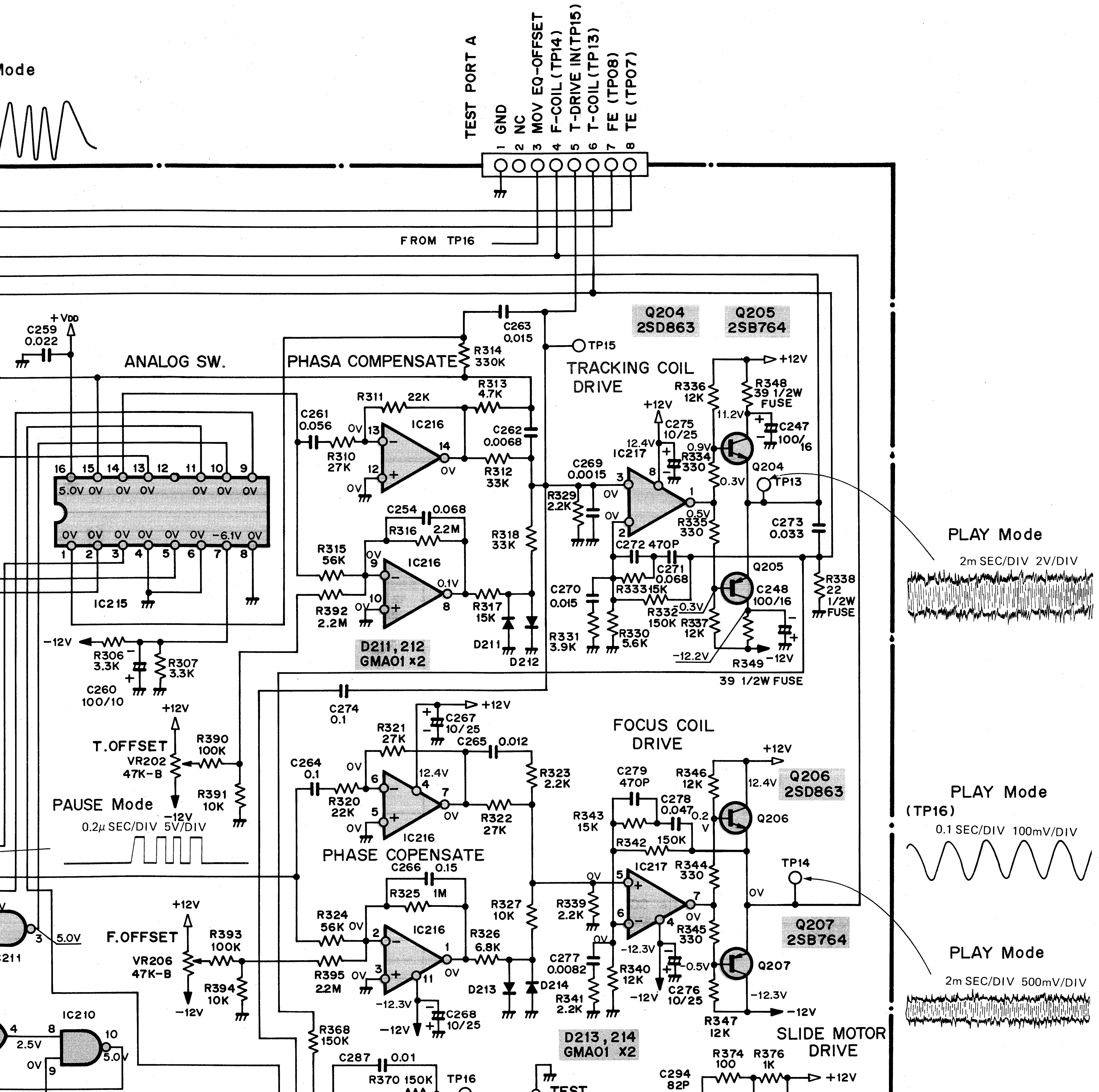
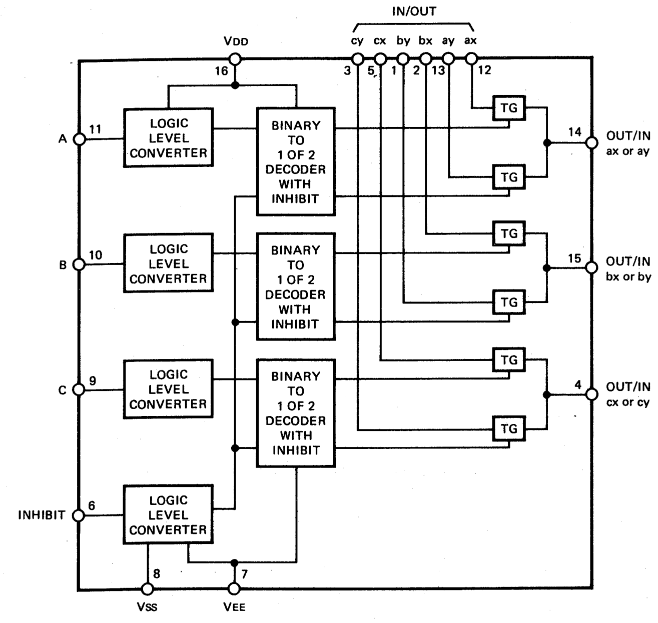

PAUSE Mode
0.2m SEC/DIV 1V/DIV
IC201~203 TC40H004x3
IC204, 208, 218 MSM4049x3
IC205 HD74LS08
IC206, 207, 214, 217 LA6458 x 4
IC209 MSM4030
IC210, 211 MSM4011x2
IC212 MSM4001
IC215 MSM4053
IC213 LA6458
IC216, 219 NJM2058 x 2
FROM PICK-UP
CN02
F-COIL
F-COIL
T-COIL
T-COIL
PLAY Mode
0.5μ SEC/DIV 2V/DIV
HF PRE AMP.
DL AMP. (1+3)-(2+4)
Q201,202 2SC536x2
D201,202 GMA01 x2
TRACKING ERROR DETECT
TP07 (TE)
FROM PICK-UP
CN01
A4
A3
A2
A1
+12V
T.GAIN VR205 4.7K-B
HF AMP 1+2+3+4
FILTER
500KHz OSC
HF GAIN
HF
FILTER
D203, 204 GMA01 x2
PLAY Mode
0.5μ SEC/DIV 2V/DIV
TP18
TP19
0.5μ SEC/DIV 2V/DIV
TP04 (HF)
FE
FROM DECODER
CN09
C1 FLAG
HF
GND
HFD
MCES
TRACKING SERVO OFF
HF ADDER 1+2+3+4
TEST PORT B
NC
MCES(TP05)
HF(TP04)
DL
GND
A2+A4(TP01)
A1+A3(TP02)
(FE) TP08
(FOK) TP10
(FOK) TP09
FOCUS ERROR AMP.
TP11(HFD)
D206~210 GMA01 x5
BREAK LOGIC
TRACKING ERROR
FOK
PAUS

DIAGRAM (SERVO)



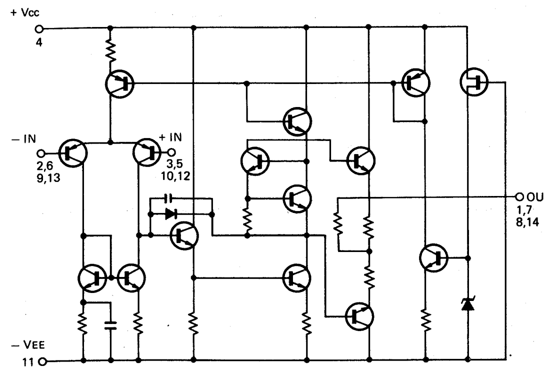
TEST PORT A
1 GND
2 NC
3 MOV EQ-OFFSET
4 F-COIL (TP14)
5 T-DRIVE IN (TP15)
6 T-COIL (TP13)
7 FE (TP08)
8 TE (TP07)
FROM TP16
Mode
ANALOG SW.
IC215
PHASA COMPENSATE
TRACKING COIL DRIVE
Q204 2SD863
Q205 2SB764
IC216
IC217
D211, 212 GMA01 ×2
TP15
TP13
R348 39 1/2W FUSE
R338 22 1/2W FUSE
R349 39 1/2W FUSE
T.OFFSET VR202 47K-B
PAUSE Mode
0.2μ SEC/DIV 5V/DIV
PHASE COPENSATE
FOCUS COIL DRIVE
Q206 2SD863
Q207 2SB764
TP14
F.OFFSET VR206 47K-B
D213, 214 GMA01 X2
IC210
TP16
TEST
SLIDE MOTOR DRIVE
+12V
-12V
PLAY Mode
2m SEC/DIV 2V/DIV
PLAY Mode
(TP16)
0.1 SEC/DIV 100mV/DIV
PLAY Mode
2m SEC/DIV 500mV/DIV

MSM4053RS



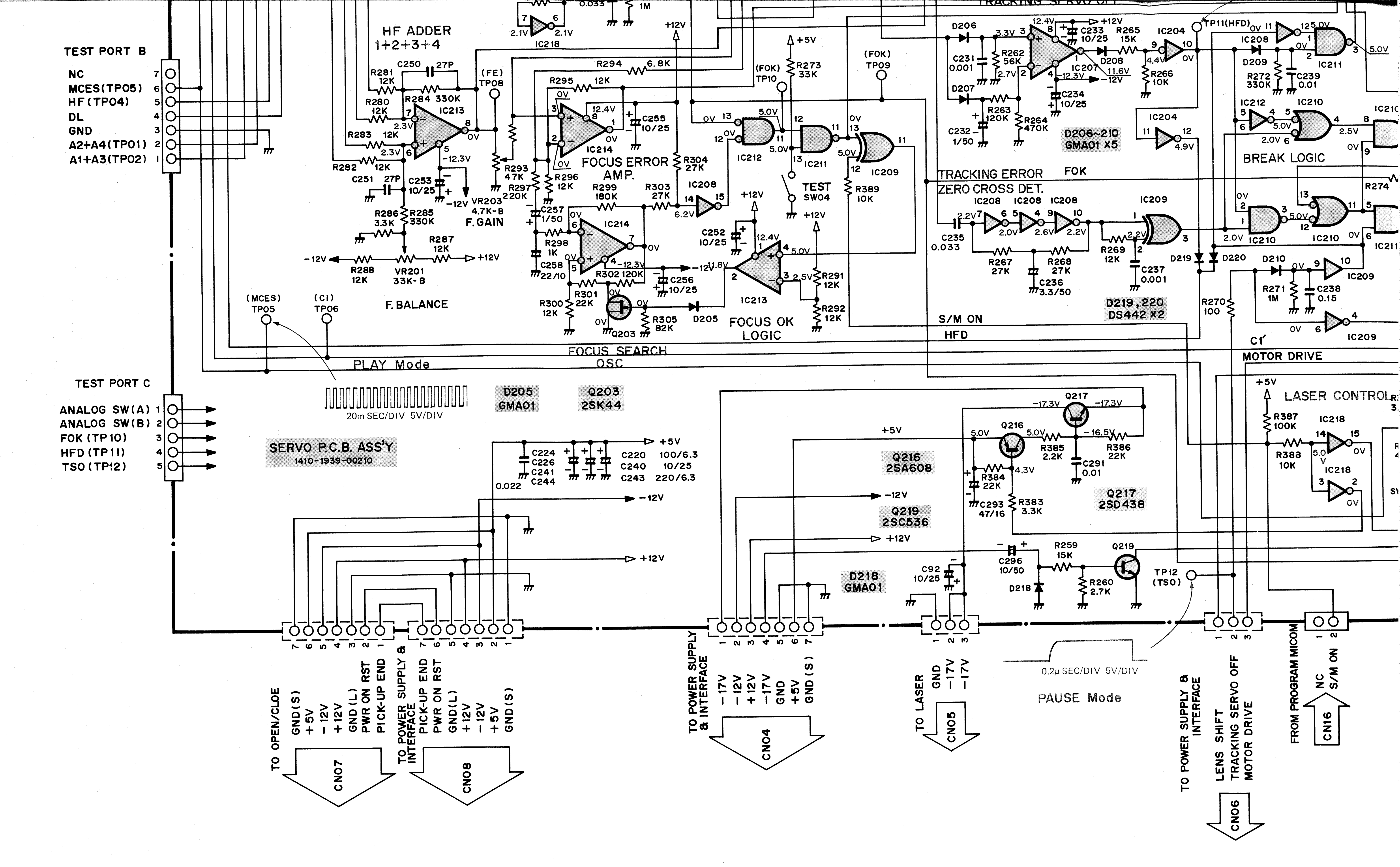
IN/OUT
VDD
cy cx by bx ay ax
A
B
C
INHIBIT
LOGIC LEVEL CONVERTER
BINARY TO 1 OF 2 DECODER WITH INHIBIT
TG
OUT/IN ax or ay
OUT/IN bx or by
OUT/IN cx or cy
VSS
VEE

NJM2058D



+Vcc 4
-IN 2,6 9,13
+IN 3,5 10,12
OUT 1,7 8,14
-VEE 11

LA6458DS

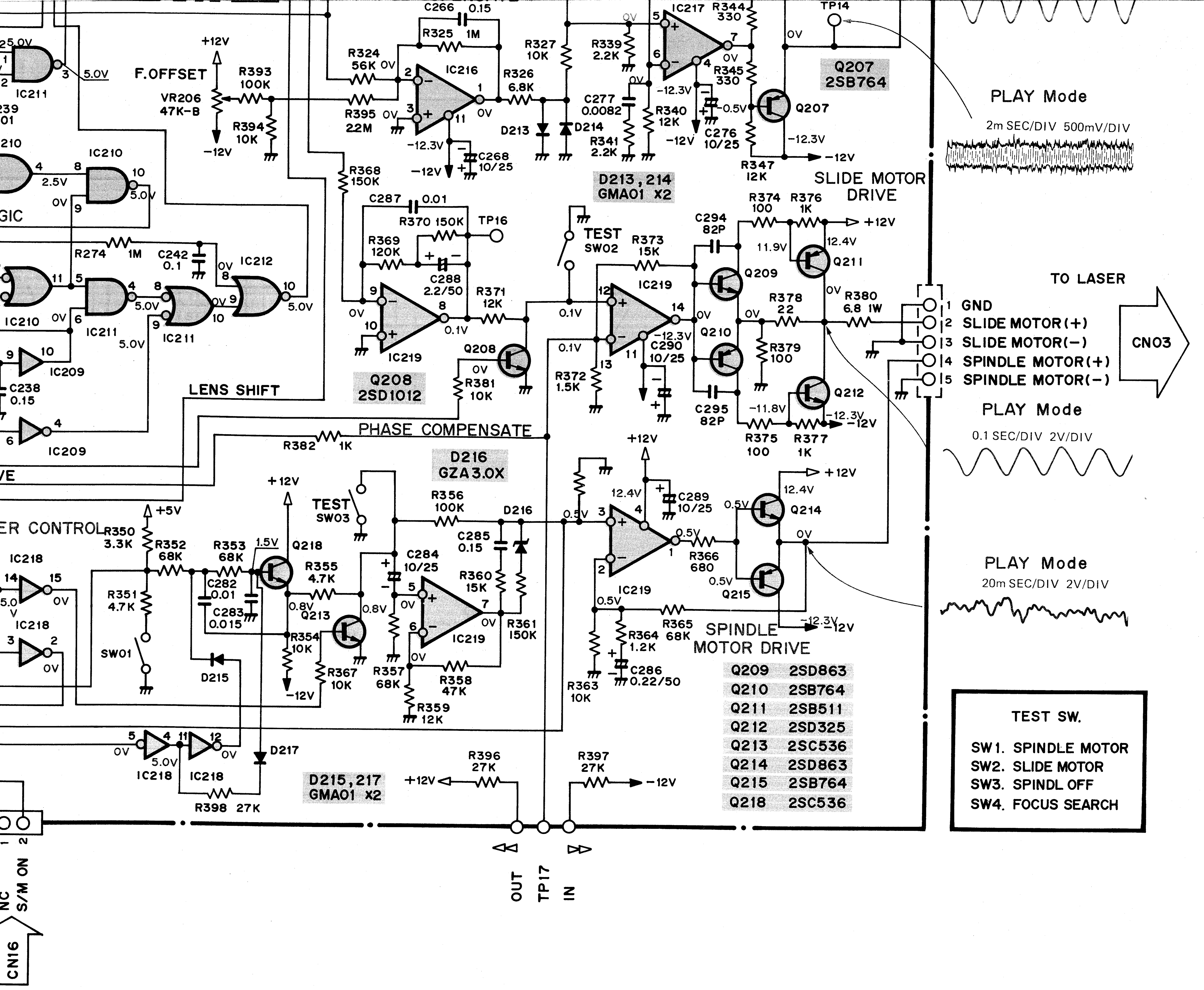


TEST PORT B
NC 7
MCES(TP05) 6
HF(TP04) 5
DL 4
GND 3
A2+A4(TP01) 2
A1+A3(TP02) 1
HF ADDER
1+2+3+4
IC213
IC218
R281 12K
C250 27P
R280 12K
R284 330K
R283 12K
R282 12K
C251 27P
C253 10/25
R286 3.3K
R285 330K
R287 12K
R288 12K
VR201 33K-B
F. BALANCE
-12V
+12V
(FE) TP08
R293 47K
R297 220K
VR203 4.7K-B
F.GAIN
R294 6.8K
R295 12K
IC214
FOCUS ERROR AMP.
C255 10/25
R296 12K
C257 1/50
R298 1K
C258 22/10
R299 180K
R302 120K
R301 22K
R300 12K
Q203
R303 27K
R304 27K
R305 82K
D205
C256 10/25
C252 10/25
IC213
R291 12K
R292 12K
FOCUS OK LOGIC
IC208
IC212
IC211
IC209
(FOK) TP10
(FOK) TP09
R273 33K
R389 10K
TEST SW04
+5V
TRACKING SERVO OFF
D206
C231 0.001
R262 56K
D207
R263 120K
R264 470K
C232 1/50
C233 10/25
C234 10/25
IC207
R265 15K
D208
R266 10K
IC204
TP11(HFD)
IC208
D209
R272 330K
C239 0.01
IC211
IC212
IC210
D206~210 GMA01 X5
BREAK LOGIC
TRACKING ERROR ZERO CROSS DET.
FOK
C235 0.033
R267 27K
R268 27K
C236 3.3/50
R269 12K
C237 0.001
D219
D220
D219,220 DS442 X2
D210
R271 1M
C238 0.15
R270 100
R274
S/M ON
HFD
C1′
MOTOR DRIVE
(MCES) TP05
(CI) TP06
FOCUS SEARCH OSC
PLAY Mode
20m SEC/DIV 5V/DIV
D205 GMA01
Q203 2SK44
TEST PORT C
ANALOG SW(A) 1
ANALOG SW(B) 2
FOK (TP10) 3
HFD (TP11) 4
TSO (TP12) 5
SERVO P.C.B. ASS'Y
1410-1939-00210
C224 C226 C241 C244 0.022
C220 C240 C243
100/6.3 10/25 220/6.3
Q216 2SA608
Q219 2SC536
Q217 2SD438
R385 2.2K
R386 22K
C291 0.01
R384 22K
R383 3.3K
C293 47/16
LASER CONTROL
R387 100K
R388 10K
IC218
C296 10/50
R259 15K
R260 2.7K
D218
D218 GMA01
C92 10/25
TP12 (TSO)
0.2μ SEC/DIV 5V/DIV
PAUSE Mode
TO OPEN/CLOE
GND(S) +5V −12V +12V GND(L) PWR ON RST PICK-UP END
CN07
TO POWER SUPPLY & INTERFACE
PICK-UP END PWR ON RST GND(L) +12V −12V +5V GND(S)
CN08
TO POWER SUPPLY & INTERFACE
−17V −12V +12V −17V GND +5V GND(S)
CN04
TO LASER
GND −17V −17V
CN05
TO POWER SUPPLY & INTERFACE
LENS SHIFT TRACKING SERVO OFF MOTOR DRIVE
CN06
FROM PROGRAM MICOM
NC S/M ON
CN16

NOTES:

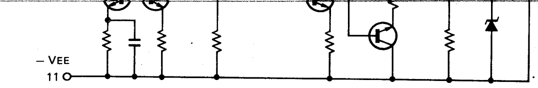
1. All resistors values are indicated in "ohm" ($K=10^3$, $M=10^6$).
2. All capacitors values are indicated in "μF" ($P=10^{-12}$)
3. All voltages indicated on the schematics are measured under the following conditions.
   a. Use a multimeter.
   b. All voltages ±10% with respect to chassis ground
   c. Voltages in STOP
   PLAY mode and
   d. AC input at 220
   e. The wave forms i
4. This is a basic schem

Because Fisher products are subject to continuous improvement, Fisher Corporation reserves the

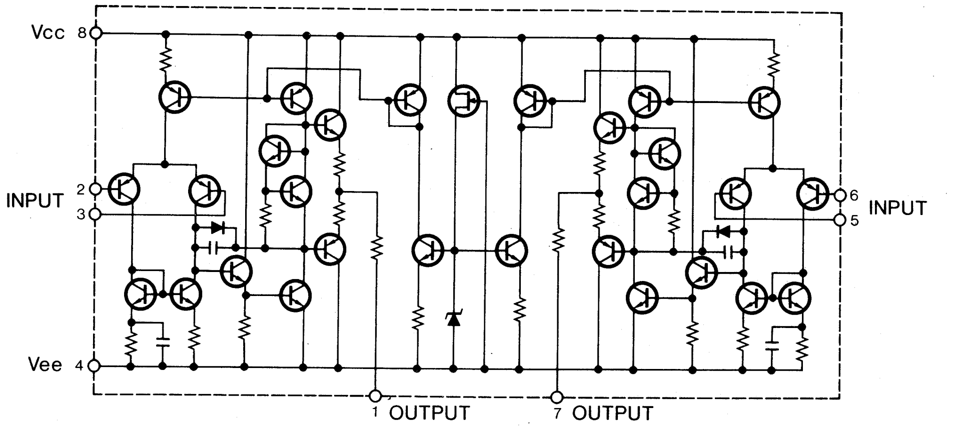

F.OFFSET
VR206 47K-B
IC210
IC211
IC212
IC209
IC216
IC217
IC218
IC219
LENS SHIFT
PHASE COMPENSATE
R382 1K
Q207 2SB764
TP14
TP16
PLAY Mode
2m SEC/DIV 500mV/DIV
D213,214 GMA01 x2
SLIDE MOTOR DRIVE
TEST SW02
Q208 2SD1012
TO LASER
1 GND
2 SLIDE MOTOR(+)
3 SLIDE MOTOR(−)
4 SPINDLE MOTOR(+)
5 SPINDLE MOTOR(−)
CN03
PLAY Mode
0.1 SEC/DIV 2V/DIV
D216 GZA3.0X
TEST SW03
SW01
PLAY Mode
20m SEC/DIV 2V/DIV
SPINDLE MOTOR DRIVE
Q209 2SD863
Q210 2SB764
Q211 2SB511
Q212 2SD325
Q213 2SC536
Q214 2SD863
Q215 2SB764
Q218 2SC536
D215,217 GMA01 x2
R396 27K
R397 27K
+12V
−12V
OUT
TP17
IN
NC
S/M ON
CN16

TEST SW.

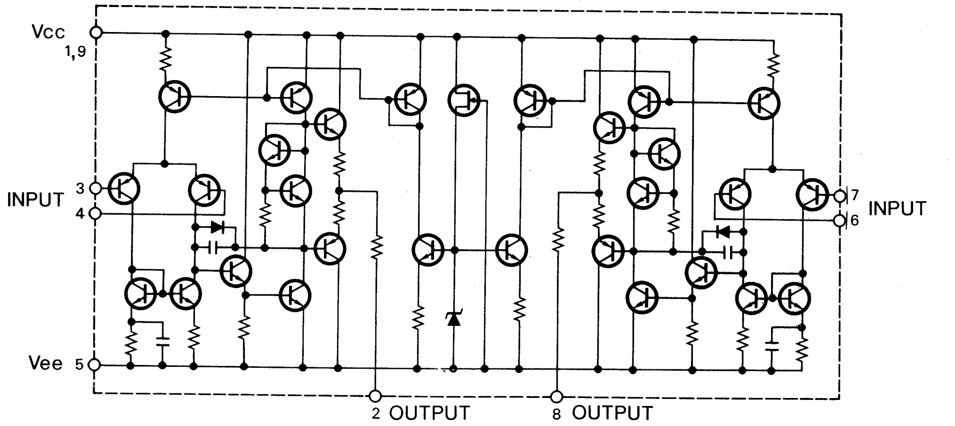
SW1. SPINDLE MOTOR
SW2. SLIDE MOTOR
SW3. SPINDL OFF
SW4. FOCUS SEARCH



LA6458DS


Vcc 8
INPUT 2
3
Vee 4
6 INPUT
5
1 OUTPUT
7 OUTPUT

LA6458SS


Vcc 1,9
INPUT 3
4
Vee 5
7 INPUT
6
2 OUTPUT
8 OUTPUT

ltages in STOP mode; if two values are indicated, the upper one shows the voltage in
AY mode and the lower one in STOP mode.
 input at 220 volts 50 Hz
e wave forms in each section, which appear when a general music disc is used, are shown here.
a basic schematic diagram.

on reserves the right to make any changes or modifications without notice.